RAILROAD GAZETTE

FRIDAY, AUGUST 29.

CONTENTS.

ILLUSTRATIONS:	PAGE.
Roney Mechanical Stokers at Spreckels' Sugar Refinery, Philadelphia	598
Gold's Pressure Regulator	600
Growth of Austrain Trains—1840-1890	601
Buildings and Structures of American Railroads	602
CONTRIBUTIONS:	
Shippers and the Uniform Bill of Lading	597
Rights of Railroads in Lost and Stolen Tickets	597
Interlocking at East Boston	597
EDITORIALS:	
Lateral Motion Trucks	604
Interstate Commerce Commission Statistical Report	605
The Census Statistics of Pig-Iron Production	606
EDITORIAL NOTES	604-606
NEW PUBLICATIONS	606
TRADE CATALOGUES	607
GENERAL NEWS:	
Locomotive Building	608
Car Building	608
Bridge Building	608
Meetings and Announcements	608
Personal	609
Elections and Appointments	609
Railroad Construction	609
General Railroad News	612
Traffic	612
MISCELLANEOUS:	
Technical	607
The Scrap Heap	608
The New York Central Strike	599
Various Strikes	600
Steel Rails Considered Chemically and Mechanically	600
Nicaragua Canal	601
New England Roadmasters' Association	607

Contributions.

Shippers and the Uniform Bill of Lading.

KANSAS CITY, MO., Aug. 20, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Referring to an editorial in your issue of Aug. 15 regarding the uniform bill of lading, you seem to have misunderstood the action of the shippers at the meeting held in Chicago some time ago. We did not attempt to formulate a new bill of lading, but, as requested by Mr. Blanchard at a previous meeting, we endeavored to point out the obnoxious clauses in the one proposed by the carriers. We did not deem it our place to formulate a bill of lading restricting our rights under the common law; but we will accept a reasonable one prepared by the carriers, provided proper consideration is given for rights waived; or we will be willing to join the carriers in formulating a bill of lading that will be acceptable to both carriers and shippers. The carriers could not expect the shippers to accept a bill of lading restricting their rights under the common law in many ways never attempted before, when no consideration whatsoever was given in return, the rates being no lower under the new form than under the old one. On the contrary, if shippers refuse to accept the new form they must pay an advanced rate of from 20 to 50 per cent. above those charged previous to its promulgation—an attempt to force an illegal rate, as no previous notice of an advance had been given.

I am satisfied that if the carriers will formulate a bill of lading restricting their liabilities on a reasonable basis, and submit it to a committee of shippers from the leading points of the country, they will have no trouble in getting it accepted. We agree with the carriers that a uniform bill is important, both to shippers and carriers.

I agree with you that the organization of a National Committee on Transportation will prove advantageous to both the shipping public and the carriers, as it will give the carriers a responsible and reasonable organization to deal with, in lieu of the present disorganized efforts of shippers to protect themselves against real or imaginary wrongs. The leading shippers of the country do not want to harass the railroads; on the contrary, they desire to work in harmony with them, giving and receiving the same consideration to questions at issue as would be granted other business firms or corporations. There will be many occasions when such an organization will be beneficial, particularly on questions of national legislation, and such other questions as are of general importance to the transportation interests of the country.

A. J. V.

The above are the initials of Mr. Vanlandingham, the Commissioner of the Kansas City Transportation Bureau, and a former railroad officer. The Bureau is an organization of the business men of that city, formed last year for the purpose of fostering their interests in freight matters. Kansas City is the only large centre, so far as we have observed, where the objections to the new bill of lading on the part of the merchants were presented in a calm and rational manner. This shows the advantage of having an experienced railroad man as a leader.—EDITOR RAILROAD GAZETTE.

Rights of Railroads in Lost and Stolen Tickets.

The Cleveland, Cincinnati, Chicago & St. Louis Railway Co.,
CINCINNATI, Aug. 8, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Please give your views on the following question, about which there seems to be a great diversity of opinion as to the rights of the passenger and the railroad company, respectfully, although instances occur requiring almost daily action.

A package of coupon tickets, properly stamped for passage, reading from a station on this line to Boston and return, was entrusted to a committee to sell at the established rate among their friends. Prior to date of starting, the committee notify the railroad company that No. 155 has been either lost or stolen from the package, and ask the railroad company to notify conductors not to receive it.

Query.—If the company by bulletin instructs its conductors to refuse to accept ticket No. 155 for passage, same having been lost or stolen, and the conductor in complying with such instructions, ejects from the train a passenger presenting it, who refuses to pay other fare, but claims to have innocently purchased the ticket from a ticket broker, is the railroad company liable for damage, and if so, to what extent?

D. B. MARTIN, G. P. A.

The ticket above referred to shows upon its face that it was issued for an excursion, and the price charged for it was much below the regular fare. These facts put purchasers on notice as to its exceptional character. The railroad company has a clear right, in issuing such a ticket and in accepting for it a rate of fare less than the rate it is entitled to charge, to prescribe any reasonable condition with respect to its use. One of the conditions which appear upon the face of the ticket is that it is "not transferable." That means that the ticket, unless bought from the railroad company or its duly accredited agent, in the ordinary course of business, may be refused by the conductor when offered for passage. The committee to which the tickets were entrusted for sale were plainly the agents of the railroad company, and a regular purchase from that committee entitled the buyer to passage; but a finder of one of the tickets, or a thief, or a purchaser from such finder or thief, or from the vendee or donee of either of them, becomes thereby entitled to no such right of passage. A railroad ticket in general, and such a ticket as this in particular, is not a negotiable instrum nt, any more than a box of soap or an invitation to your cousin's wedding. If it is lost or stolen it still belongs to the loser or the person from whom it has been stolen, a d no rights are acquired by the finder or thief, as against the true owner. Any person, there ore, who buys such a ticket as this from a scalper is chargeable with notice of everything set forth upon the face of the ticket, and, among other things, of the fact that it is declared to be not transferable. Accordingly the company may, at its option, refuse to accept the ticket if presented, as in this case, by any other person than the original purchaser; and, if the passenger fails or refuses to pay his fare, he may lawfully be ejected from the train. For so doing, assuming that the refusal and the ejection is made in an orderly and decent manner, the railroad company is not liable. The remedy of the passenger who bought the ticket from the scalper is against the person who sold it to him and thereby defrauded him, and not against the railroad company; and this fable teaches that it is unsafe to buy tickets of this sort from scalpers. This is, of course, upon the assumption that the ticket was distinguishable by its number and had been actually purchased from a scalper, and that the committee were merely agents to sell the tickets for the railroad company. If the ticket had no number upon it or could not be otherwise distinguished from any other of the 175 tickets, or if it were not bought from a third party or presented by a thief, or if the committee had bought and paid for the ticket and were therefore acting essentially as ticket brokers in selling it, the rule might be otherwise. But on the assumption of fact disclosed in the letter of inquiry the railroad company is not liable. —EDITOR RAILROAD GAZETTE.

Interlocking at East Boston.

BOSTON, Aug. 26, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your editorial criticism, Aug. 22, upon the interlocking plant lately installed in our East Boston yard (Boston, Revere Beach & Lynn Railroad) you seem to have forgotten some of the difficulties in the way of conforming to what we are aware is the best of good practice.

The plan of yard illustrated is not drawn to scale, and the actual lack of room between the tracks and in the tunnel does not appear in the plan, so that while on paper it seems possible to put the route signals 3, 5, 7, 9 in the tunnel behind the switch and the detector bar, it was, as a matter of fact, impossible to do so; but the present position makes traffic safe in view of the standing rule requiring enginemen to stop two car lengths back of a stop signal at danger. The same remark applies to starting signal 6, which governs track *K* behind the switch; and as all the starting signals, 4, 6, 8, 10, are operated by the same lever through selectors controlled by the switches, you will see that there is no disregard of safety nor of good practice.

Again, *one* (and of course only one) of the signals, 3, 5, 7, 9, must invariably be at safety before any inward train can get a clear signal at sea wall, giving it right of way through the tunnel; nor can the route signal be then changed until said inward train has passed it. Nor was it possible to place the outward signals any differently than as shown. Long trains, which are made up on track *K*, often entirely overlap the switch leading to track *B*; this made it necessary to locate signal 6 farther ahead than signal 10, the bracket being used for lack of room between tracks. The starting signals also provide for yard movements west of Marginal street, and, since each of said signals is interlocked with the Sea Wall signal (No. 1), these movements can safely be permitted, and yet not give a route outward through the tunnel, this being absolutely controlled by the tunnel block signal (No. 2).

The Boston, Revere Beach & Lynn Railroad regrets that it is no larger, that it is embarrassed by its physical limitations, that its officers exhibit any originality of mind whatever, or that it dares to indorse anything that is new and therefore presumably bad. It however does intend to cut its coat, not merely according to the cloth, but most certainly according to the figure to be fitted. It seems to us that the proper thing for the critic to show is—knowing all the facts and the special exigencies that must govern—in what way can the plan be bettered? Knowing that we had a peculiarly difficult problem before us, much more care was taken than usual, in order to throw every safeguard around the operation of the yard and tunnel, and it would be gratifying to know how far our efforts in this direction are worthy of approval. Some novel features were consequently forced upon us, such as requiring every west-bound train entering the tunnel to protect itself by automatically setting the sea wall semaphore at danger as it passes the same, fixing the limit of the tunnel block in advance of the signal governing it, the double system of electric annunciators, the visual as well as sound indicators in the signal tower, some of the electric-locking devices and the methods of securing an efficient track circuit.

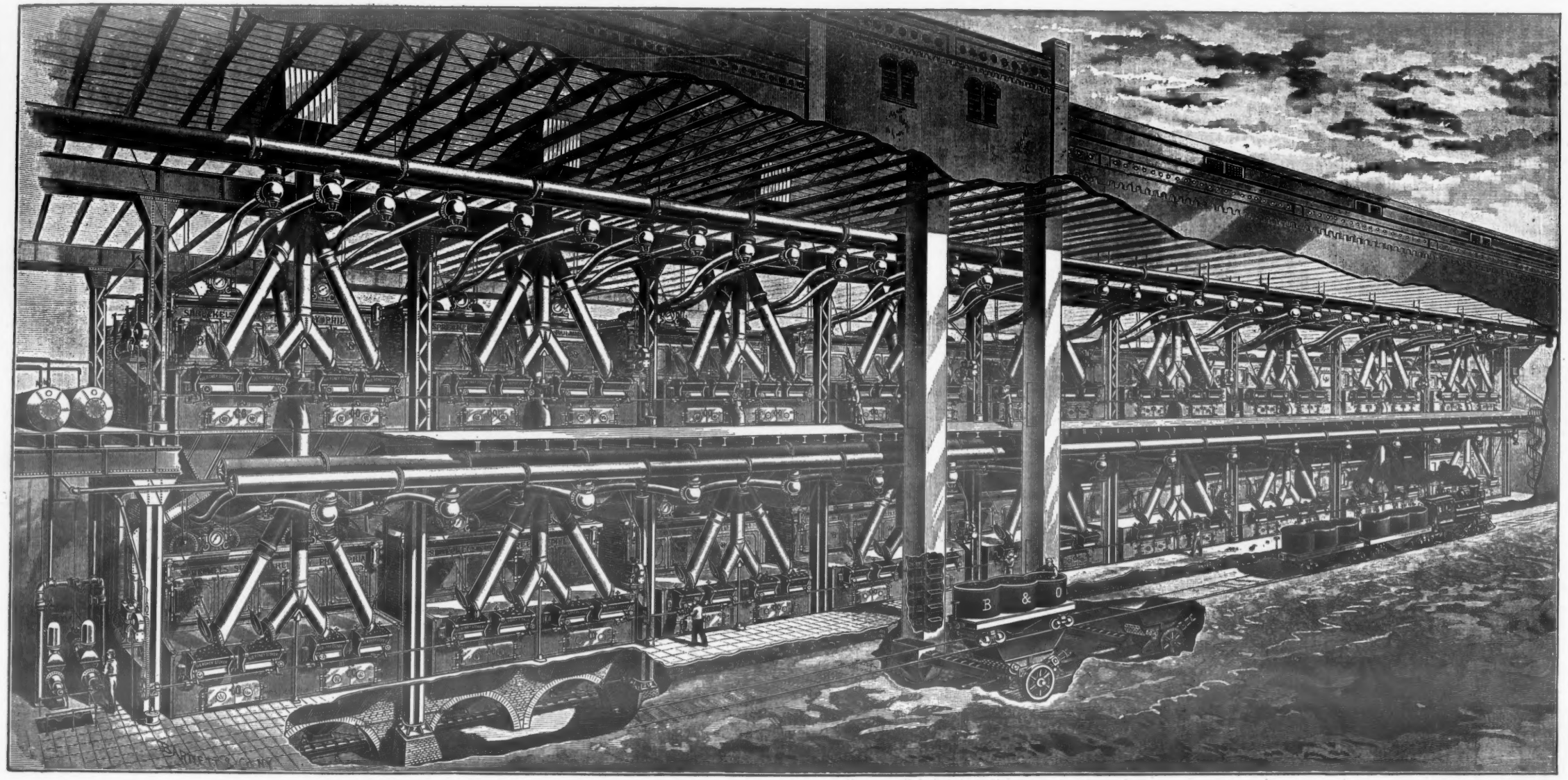
I cannot quite agree with the conclusions which you draw as to enginemen not sufficiently respecting the signals or getting wrong ideas into their heads. For, first, there has been a marked increase in the respect shown to the signals by the men, and a very decided improvement in their service in consequence. The sharp difference between danger and safety, especially at night, the certainty that but one route at a time can be given, and the promptness as well as the quietness of all train movements and the directions given for the same, have wonderfully increased the *morale* and efficiency of both the enginemen and trainmen; and second, it is not believed that any special orders and instructions to the men, issued from time to time, necessarily require a surgical operation upon their craniums in order to remove one set of ideas and substitute another. . . .

C. A. HAMMOND.

The Roney Mechanical Stoker and Smokeless Furnace.

The most extensive application of mechanical stokers in connection with coal and ash-handling machinery in this country, and probably in the world, is at Claus Spreckels' Sugar Refinery, Philadelphia, Pa., and is illustrated on the following pages. This plant, the contract for which was awarded to Westinghouse, Church, Kerr & Co., consists of 60 Roney stokers, with coal and ash-handling machinery, serving a battery of 7,500 horse power Babcock & Wilcox boilers, arranged in two tiers, one above the other, while a coal bunker with a capacity of 3,000 tons occupies the third story of the boiler house. The boilers are arranged in batteries of 500 horse power each, with four stokers to each battery, and each double battery of eight stokers operated by a small Westinghouse engine, placed conveniently upon a bracket bolted to the iron columns supporting the floor above. The boiler house is fireproof throughout, being constructed entirely of brick, iron and stone.

The fuel used is Cumberland "run-of-mine" coal, and is delivered by cars on track alongside the boiler house. Underneath this track are placed two toothed roll crushers, large enough to receive and crush the largest masses of coal thrown into them. Under the crushers, and between the rails, are placed hoppers capable of holding a car load each. A pair of spiral conveyors connect the crushers with vertical bucket elevators having a capacity each of a ton a minute, and either one capable of handling sufficient coal to supply the entire plant of boilers. The coal is unloaded by dropping the bottom of the car, and as fast as crushed is delivered to the elevators, which discharge it by means of cross conveyors at the top of the building into one long conveyor, distributing it the entire length of the coal bunker. The crushed coal, which is of the size of small egg and under, flows by gravity through branched chutes to the stoker hoppers. Gates at the bottom of the chutes regulate the quantity of coal delivered to each stoker, so that the hoppers are at all times full. When a battery is shut down these gates are closed, and the coal in the chutes remains stationary. The ash and cinder from each pair of stokers fall into iron ash pits under each floor, whence they are discharged into a horizontal conveyor in the basement, the ashes from the upper tier of boilers being conducted through iron



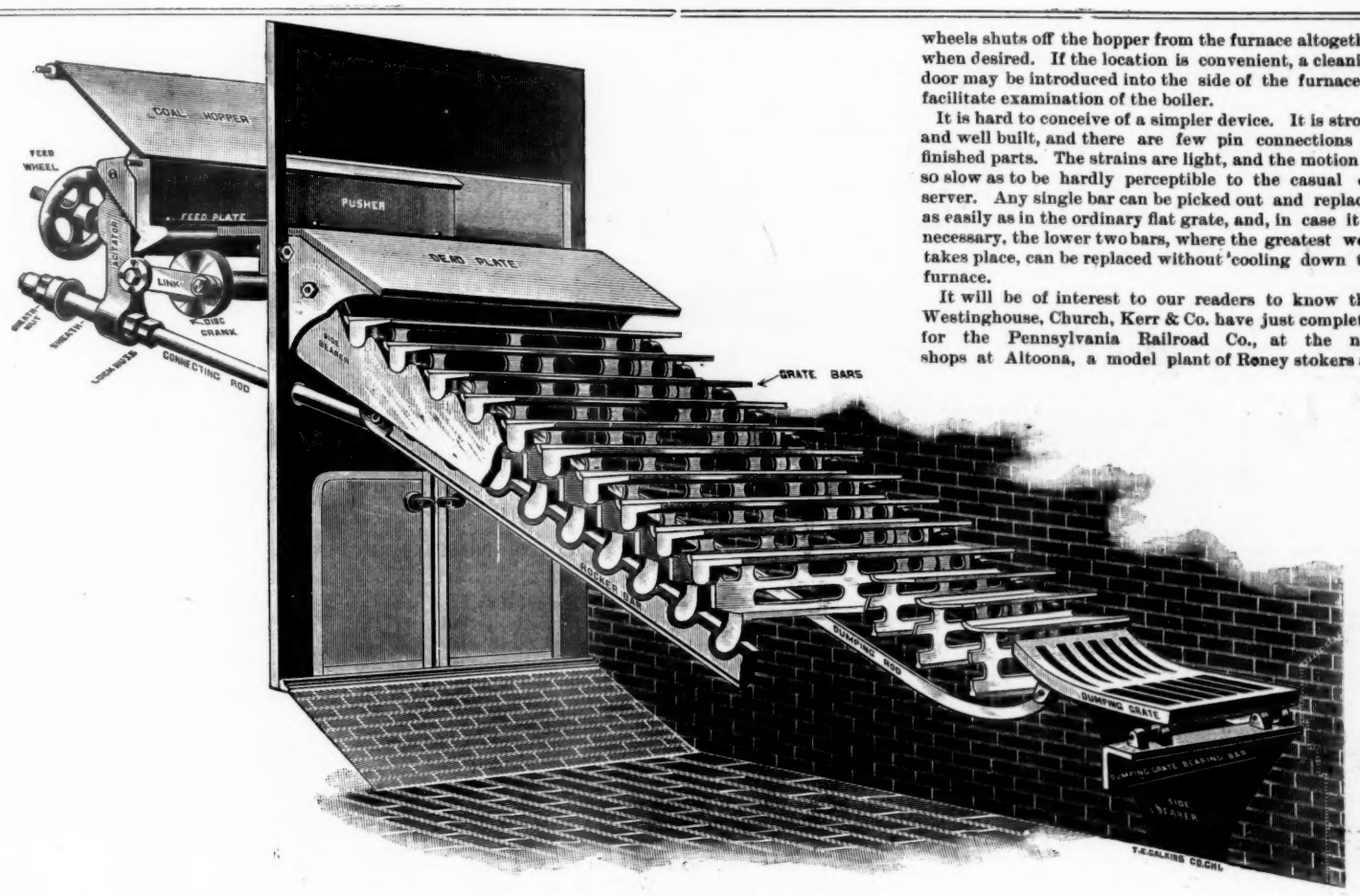
RONEY MECHANICAL STOKERS AT SPRECKELS' SUGAR REFINERY, PHILADELPHIA.

chutes placed between the batteries of boilers on the first floor. An elevator at one end of the boiler house receives the ashes and delivers them into an ash-bin sufficiently elevated to discharge by gravity into cars outside the building for removal. One Westinghouse engine furnishes the necessary power for all the coal and ash machinery.

So perfect is the entire system of crushers, conveyors and elevators that there is no handling of coal or ashes from the time the bottom of the car is dropped until the refuse is discharged into cars for removal, and in its freedom from dust, heat and smoke this boiler house rivals the most successful steam plants fired by natural gas.

This stoker is adapted to burn the following fuels: bituminous, semi-bituminous and lignite coals without smoke; anthracite when mixed with a small proportion of soft coal, run-of-mine, slack, mixture of anthracite yard screenings and soft coal slack, cotton seed hulls, rice hulls, chaff, bagasse and waste products generally. The apparatus receives the fuel in bulk, and thereafter, without further handling, feeds it continuously and at any desired to the furnace; burns the combustible portion and deposits the ash and cinder in the ash pit ready for removal. The fuel to be burned is dumped into the hopper on the boiler front. In small plants it may be shoveled in by hand. In large plants it is usually handled direct from the car to the hopper by elevators or conveyors.

Set in the lower part of the hopper is a pusher, see figs. 1 and 2, to which is attached by a flexible connection the feed plate forming the bottom of the hopper. The pusher, by a vibratory motion, carrying with it the feed plate, gradually forces the fuel on to the grates over the dead plate. The grates consist of horizontal flat top bars running from side to side in the furnace, carried on inclined side bearers extending from the throat of the hopper to the rear bottom of the ash pit. The grates form a series of steps, onto the top step of which coal is fed from the dead plate. The inclination is not sufficient to cause the free descent of the coal. Each bar rests in a concave seat in the bearer, and is capable of an adjustable rocking. All the grate bars are coupled together by a rocker bar, the notches of which engage with a lug on the lower rib of each grate bar, pin connections being made with two of the grate bars only, for the purpose of holding the rocker bar in position. A variable back-and-forth motion being given to the rocker bar, through a connecting rod, the grate bars necessarily rock in unison. Assuming the grates to be covered by a bed of coal, and fresh fuel being fed in at the top, it is obvious that when the grates rock forward the fire will tend to work down in a body. But before the coal can move too far the bars rock back to the stepped position, checking the downward motion, breaking up the cake thoroughly over the whole surface and admitting a free volume of air



THE RONEY MECHANICAL STOKER—Fig. 1.

through the fire. The rocking motion is slow, being from seven to ten strokes per minute, according to the grade of the coal. This alternate checking and starting motion, being continuous, keeps the fire constantly stirred and broken up from underneath, and finally lands the cinder and ash on the dumping plate below. By releasing the dumping rod the dumping grate tilts forward, throwing the cinder into the ash pit. The dumping grate is made in two parts, so that each half can be dumped separately. The operation of the stoker consists of a slow but continuous feed, a constant stirring of the fire, and an automatic rejection of the cinder, all performed without opening the fire doors.

The actuating motion is taken from one driving shaft. In a single stoker this shaft may either be driven through a worm gear from a small engine attached to the boiler front, or may be driven by a link belt from any convenient shaft. In large batteries of boilers, the driving shaft is extended across all the boiler fronts, delivering power to each stoker, as shown in the large cut, and with the elevators an l conveyors is driven by a small independent engine. The largest stoker can easily be turned over by hand. The worm gear shaft carries a disk and wrist pin from which a link couples to the agitator. See figs 2 and 3. Through the eye of the agitator passes a stud screwed into the pusher, on which stud is a feed wheel by which the stroke of the pusher, and consequently the amount of feed, is regulated. The agitator having a fixed stroke, it is apparent that if the feed wheel is run down against it in the position shown in the engraving the pusher will be given its full traverse and the greatest feed. If run back to clear the travel of the agitator, the pusher will, of course, have no motion and the feed will stop. Between these extremes any desired rate of feed can be given.

In like manner the rock of the grate bars can be adjusted between any limiting angles, and over a range of motion from no movement to full throw, by means of the sheath nut and jam nuts on the connecting rod. By these two simple adjustments within the comprehension of the ordinary helper, the whole action of the stoker is controlled and the fires forced, checked, or banked at will. There are poker doors in the front on each side of the hopper, through which the whole grate can be seen, and the condition of the cinder on the dumping grate determined. A gate controlled by a couple of hand wheels shuts off the hopper from the furnace altogether when desired. If the location is convenient, a cleaning door may be introduced into the side of the furnace to facilitate examination of the boiler.

It is hard to conceive of a simpler device. It is strong and well built, and there are few pin connections or finished parts. The strains are light, and the motion is so slow as to be hardly perceptible to the casual observer. Any single bar can be picked out and replaced as easily as in the ordinary flat grate, and, in case it is necessary, the lower two bars, where the greatest wear takes place, can be replaced without cooling down the furnace.

It will be of interest to our readers to know that Westinghouse, Church, Kerr & Co. have just completed for the Pennsylvania Railroad Co., at the new shops at Altoona, a model plant of Roney stokers applied to horizontal tubular boilers, in connection with coal crushers and coal and ash handling machinery. This plant is so arranged that the coal, when unloaded from the car, is handled in the same manner as in the plant here described. The boilers in the magnificent new passenger station of the Wisconsin Central, at Chicago, are also equipped with this stoker.

Many stokers are being applied in the large steel works around Pittsburgh, where, owing to the increased price of natural gas, nearly all the large concerns are making preparations for returning to coal for steam making. The perfect combustion obtained by means of the automatic stoker makes it possible to obtain from slack coal results heretofore obtained only from the best screened lump when fired by hand; and the absence of smoke, due to the perfect combustion, makes it a rival of natural gas in cities where the soft coal smoke is such a nuisance.

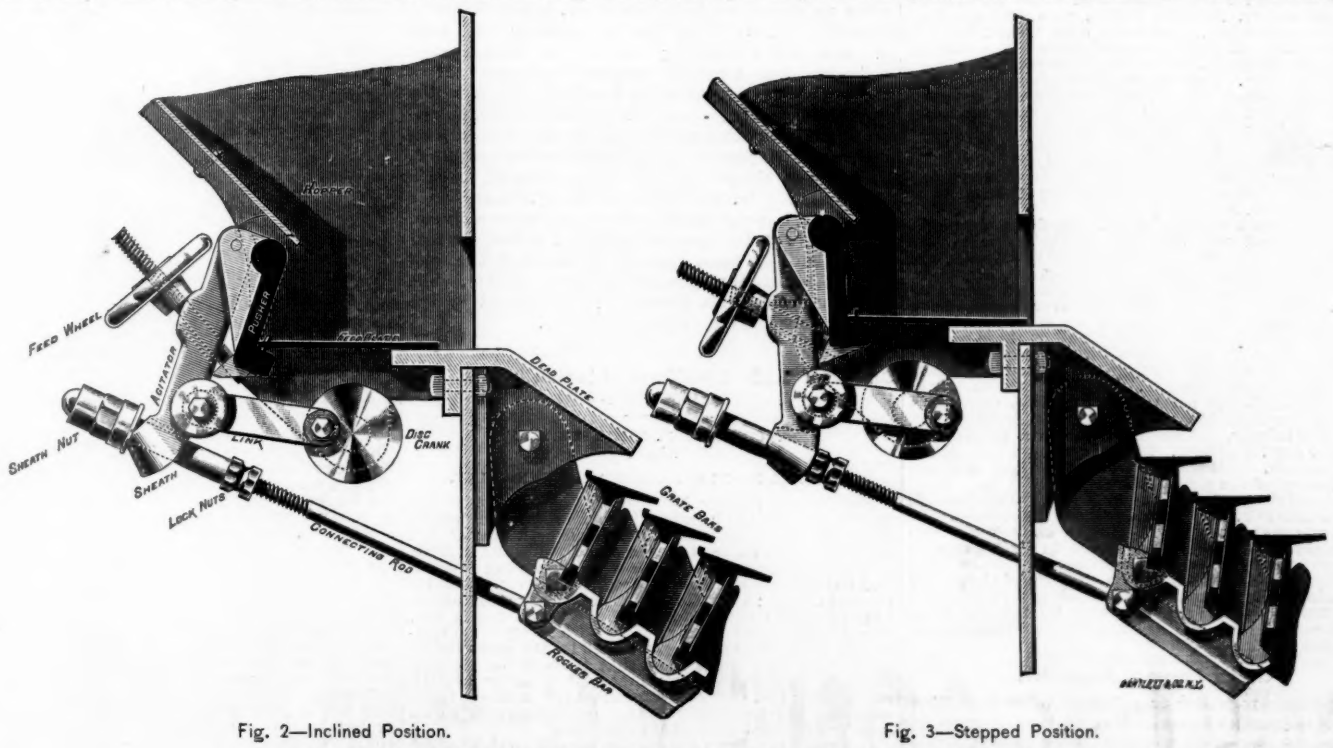


Fig. 2—Inclined Position. Fig. 3—Stepped Position.

RONEY MECHANICAL STOKER—DETAILS OF FEED AND GRATE MOVEMENT.

The New York Central Strike.

The company has gradually improved its service and at the end of last week the officers stated that freight trains were moving normally. Perishable freight was

received at all points Aug. 25. The disturbance of the business of manufacturers and merchants was, however, so widespread that it is still felt on all parts of the line, and even in places distant from the New York Central. The daily newspapers, especially those in New York City, have published long accounts of the doings of the leaders of the Knights of Labor and of the Federation of Railway Employés, which body had been appealed to by Mr. Powderly for aid and sympathy. On Friday Mr. Powderly issued a long public statement, in which, however, there was little that was new. He complained that the employés of the road who went before the Legislature at the last session to advocate the passage of a weekly payment bill were terrorized by the attorneys of the railroad company. He printed the affidavit of an Austrian of New York City, who is said to be hardly able to speak the English language, who says that he was engaged in New York on Aug. 13 to go to Albany as a watchman; that on arriving there he had thrust into his hands a paper, which he did not read for some time afterwards, but which proved to be an appointment as a special deputy sheriff. He avers that he was so appointed without his consent. Mr. Powderly, on the same day, published a copy of a letter which he said he had sent to P. M. Arthur, asking to have the position of the Brotherhood of Locomotive Engineers defined. The allegations that employés of the New York Central had been compelled to pay petty bosses money in order to keep their places refer to Italian laborers in New York City, and apparently have no connection with the Knights of Labor. Mr. Powderly evidently took up this argument for mere effect. Mr. Webb says that the alleged extortions were probably perpetrated by Italian padrones who act as agents in getting employment for the men. It was stated on Saturday that the switchmen who struck at Buffalo were still out, the officers of their organization strictly maintaining the rule that members should not take the places of members of any labor union. It seems that the company filled the places of the Buffalo strikers with comparatively little trouble.

A number of business men of Amsterdam sent Vice-President Webb a letter congratulating him on his firm stand against the strikers.

On Friday Mr. Webb made public a statement that the men who were the occasion of the strike had been discharged for "drunkenness, incapacity, breach of duty, insurbordination, and for lack of work." He intimated that the drunkard worked in a switch tower, that one of the breaches of duty was in being away two days without leave and without excuse, and that the insurbordination was an attempt to dictate what and how much work should be done on certain occasions. Mr. Powderly complains that the men who were dismissed simply from lack of work were disgraced by being classed with those who were dismissed for offenses, but it does not appear that any individuals were dismissed wholly because of lack of work. This cause and the dereliction of the men were apparently combined in each individual case.

Various Strikes.

Demands for higher wages have been "too numerous to mention" during the past few weeks. Perhaps they are not more so than at several periods during the past year, but the New York Central strike being before the public mind has given prominence to these otherwise isolated instances. The employés of the Illinois Central have told the newspapers at a number of points on that system that they were going to Chicago to demand an increase, and they went. Two or three silly strikes on other Chicago roads, which, however, were soon settled, will be recalled by our readers. Last Saturday the engineers and firemen of the Railway Switching Association, which is a combination of the Chicago roads for doing the switching at the Union Stock Yards, struck for 29 cents an hour for engineers and 18 cents for firemen, being an advance of 3 cents and 1½ cents, respectively. After some deliberation the Association granted these demands, but the settlement had hardly been made when the switchmen held a little meeting and resolved to demand an increase of three cents per hour. Before their demands were officially communicated to the Association they left their work, and a second blockade ensued. Both the enginemen and the switchmen struck first and presented their demands afterward.

On Tuesday morning the switchmen in the Chicago & Alton yards at Bridgeport (Chicago) struck on account of a change of yardmaster. The company discharged the yardmaster for incapability and called back, at an increased salary, Thomas Welsh, who had resigned some time previously. The men then struck because promotion was not made from their ranks. The strikers are not all union men, and their action was hasty, even for Chicago men. The road secured police protection, and announces that none of the strikers will be re-employed. General Manager Chappell is very firm, and declares that there will be no compromise. The managers, on the strike of the switchmen at the Stock Yards, dissolved the Switching Association and proceeded to do the switching individually, that is, each road sending in its own engines and crews. Speaking of the strike at the Stock Yards, Mr. Chappell said:

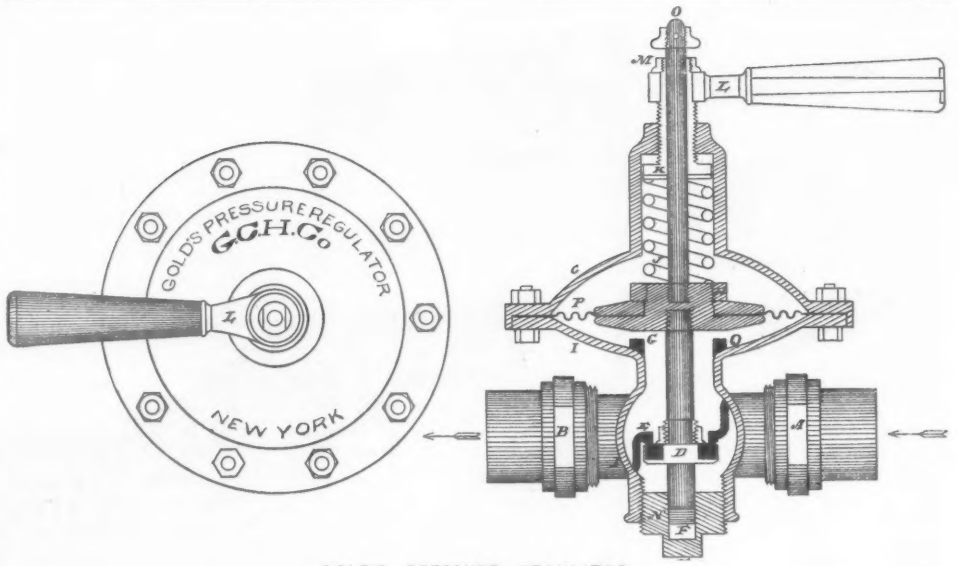
"The railroads will not grant the demands of the switchmen, and will not yield to their threats. No amount of injury to property or months of idleness, and not even the absolute loss of every cent of revenue by every Chicago road, will swerve the railroads from this course. It is the first time the roads ever united. They will stand firm as a rock, if it ties up every road in the country indefinitely, and bankrupts all of those waging the war. It has come to a question of the roads being bankrupted by irresponsible employés, and the roads decided to fight right here. . . . The present pay of the switchmen is $75 per month for night foremen of crews, $70 for night helpers, $70 for day foremen and $65 for day helpers. These figures are on a basis of ten hours per day for 26 days. The men all earn from $85 to $95 per month. This scale of wages was given the men in settlement of the strike of 1881."

Nearly all the yardmen employed by the Delaware & Hudson Canal Co. at Green Island (Troy) struck last week because the company "handled New York Central freight." The company succeeded in getting enough new men to avoid a very bad blockade.

The brakemen on the Stockton division of the Southern Pacific made a demand last week for an increase of wages from $65 to $75 a month, with no hospital dues. They threatened to strike at once, but we do not hear of any "tie-up."

Gold's Pressure Regulator.

The pressure regulator or reducing valve here illustrated is the result of a series of careful experiments extending over several winters, and the extended study of actual service made by the inventor. The cut shows the regulator in section. The valve body *I* is made specially strong and has a valve seat *E*, and an inlet and outlet for steam at *A* and *B*. The disc seat is of composition metal, fitted into the cup on spindle *D*, and is held in place by the nut *R*. To fit in a new disc it is only necessary to remove the plug *N* and unscrew the spindle *D* from the lower diaphram flange *G*. The diaphram is made of phosphor bronze slightly corrugated. This insures flexibility and enables it to stand a high pressure. It is bolted between the valve body casting and the hood, and is held in place by the male and female flanges *G*.



GOLD'S PRESSURE REGULATOR.

The upper part of the spindle is screwed into the hexagon nut *H*, and passes out through the cap and the hollow screw *K*; it is independent of the handle *D* until the valve is required to be shut entirely, when by turning the handle to the left it carries the spindle up with it and brings the valve disc to its seat. The cast steel spring *J* is wound around this upper spindle, and is operated by the lever handle to withstand such steam pressure as may be required to produce the necessary delivery pressure. By turning the lever to the right the hollow screw *K*, to which it is fitted, will cause the spring to bear on the diaphram and keep the valve open, allowing higher pressure steam to pass through the valve. By turning to the left the pressure of the spring is taken from the diaphram, and only such lower pressure as may be required is obtained.

The diaphram cannot be forced by the spring to a point below the diaphram stops *Q*; this movement is ¼ in. The hood or cap which covers the diaphram prevents at any time the cab of a locomotive from being filled with steam should the diaphram break or leak. The steel spring being in the hood does not come into direct contact with the steam, which tends to corrode it and weaken its tension, as in the case where the spring is placed in the steam chamber.

In operation the steam from the boiler enters the valve and strikes the diaphram at a high pressure; the handle of the valve is turned to the left and the spring then offers no opposition to the diaphram, which is forced upward by the steam, so far reducing the area of the valve opening until the steam gauge registers the required delivery pressure. If a higher pressure is required the handle is turned to the right and the spring bears down upon the diaphram, preventing it from rising and closing the valve further than will permit the passage of the higher pressure required. In this way the pressure of steam delivered to each car may be regulated within a pound or two, and on a large train, if one of the regulators is fitted on each car, the pressure of steam may be regulated so that the rear car will have the same pressure as the first one, and avoid the nuisance of some cars being overheated, while others are cold. This device is manufactured by the Gold Car Heating Co., of New York City.

On Steel Rails Considered Chemically and Mechanically.

BY CHRISTER P. SANDBERG, C. E.

II. STEEL RAILS CONSIDERED MECHANICALLY.

Heavier and Harder Rails for Safety.—The only safe way to increase the hardness is to increase the weight of the rail at the same time, making it both heavier and harder; but to make it harder alone is to run a great risk of fractures, notwithstanding the strong temptation to try to obtain more wear or economy without increased outlay; and it is just here that the soundness of the theory adopted for the Goliath rail comes out. Heavier rails can be made harder with safety from fractures. It was this argument, added to the necessity of greater stability of the road, that induced the Belgian State Railroad to make the first trial with the Goliath rail in 1886; and they have since laid ten to fifteen thousand tons yearly on their roads, amounting now to an aggregate of nearly fifty thousand tons.

In Table 3 is given a comparison between weight of engines and weight of rails shown at the Paris Exhibition last year; and it is interesting to find how all French railroads have of late years increased the weight their rails, the Paris, Lyons & Mediterranean up to 94 lbs. per yard. The conclusion that in England there is light rolling stock on heavy rails, while on the Continent generally it is the opposite, is a clear argument for the necessity of introducing heavier rails on the Continent. But the most forcible argument is that the difference in price of old and new rails is so small. For instance, six months ago the price in England of old rails was £4 per ton, and now the price of new rails is only £5; thus four-fifths of the value can be realized after wearing them out, if bought and sold at a proper time. The Swedish Government Railroads, for which the author is consulting engineer in regard to rails, have actually availed themselves of this favorable period for selling their old rails and getting new rails at the above prices. In fact, nowadays, the true economy for users of steel rails is to have plenty of metal in the rails, thereby saving cost of maintenance; just the reverse of what was the case twenty years ago, when steel was three times the price it is now.

A singular coincidence happened a few months ago. At the same time that it was decided at a railroad conference at Rome in January last that "trains de luxe," corresponding with our trains provided with dining and sleeping cars, should be established between all great towns on the Continent, another congress was held at Düsseldorf, where one German State Railroad authority declared that the rails were heavy enough and the roads good enough. In Austria the Goliath rail has found more support, and the Nestor of iron and steel in that country, the venerable Professor Peter Tunner, writes that the simplest reasoning would be enough to uphold the necessity of the Goliath rail for heavy traffic, which to him is so clear and simple a matter that he cannot understand how any one can doubt it. In an address delivered in Vienna on Dec. 7 last by Herr Von Hornbostel before the Austrian Society of Engineers, the following remarks occur: ". . . The safety of the train must be preserved while the speed is being increased; and I claim that this question of safety prevents our increasing the speed while the roads remain in their present condition. All railroads running faster trains than in Austria have better roads. The English engineers lay their heavy rails in large chairs. The French trains run over 92-lb. rails, and the sleepers are spaced closer than here. The Belgians have the Goliath rail, 106 lbs. per yard (53 kilos. per metre). Austrian rails have the following weights per yard:

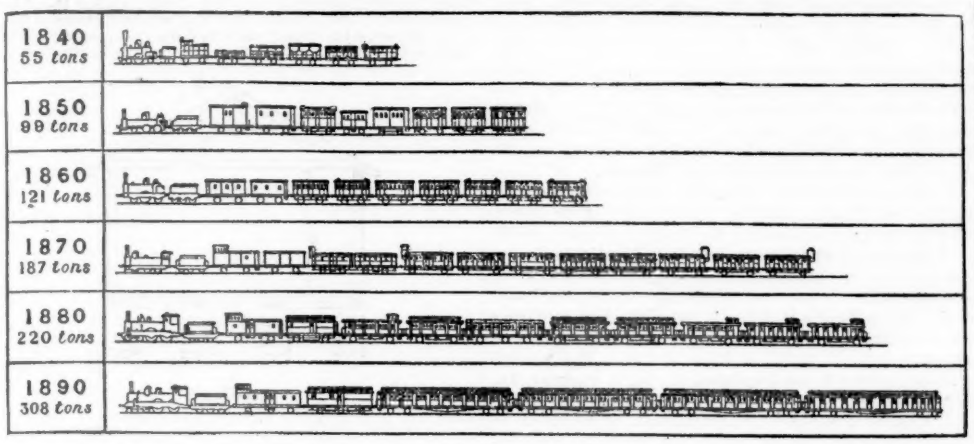
Royal State Railroad	71	lbs. per yard.
State Railroad	70½	"
King Ferdinand Northern Railroad	70	"
Southern Railroad	69½	"
North Western Railroad	67	"

Herr von Hornbostel's address is illustrated by a diagram, showing the growth of trains in Austria, which we reproduce herewith.

Thus, in Austria, continues Mr. Sandberg, engineers seem aware of the desirability of using heavier rails; and it seems astonishing, when French private railroads have followed the example of the Belgian State railroads, that German State railroads should remain without heavier rails for their roads.

Flange Rail without Base Plate.—As English railroads rank first in respect to safety, economy of maintenance and speed, they were naturally regarded at the Paris congress as the best for high speed and heavy traffic. Even the double-headed rails and chairs laid on half the railroads in France, although the rails are somewhat old-fashioned, were considered superior to the flange rail. . . . For a heavily worked railroad to exchange its flange rail for a double or bull-headed rail with chairs is almost an impossibility; therefore it is not a question of choice, as in constructing a new line. Hence even those who in Paris recommended the English plan as the best preferred themselves to strengthen their own lines by the adoption of heavier flange rails to correspond with their increased traffic.

Goliath Flange Rail with Steel Plate and Steel Key.—Then comes the question whether, by adopting heavier flange rails with steel base plates of equal surface to the chair, a road cannot be made as good and strong as on the English plan. As to the cost, a small saving may be counted upon for the Goliath flange rail with large steel base plates weighing 13 lbs. each, which latter cost only two-thirds of the chairs. But, be that as it may, the main question whether as good and strong a road can be obtained will be answered by the Goliath rail already adopted on the Continent. There is also hope of a fair comparison in England from a trial of the Goliath flange rail with steel base plates and steel keys, all made at the Barrow Steel Works; this trial is now being made on the Furness Railroad, thanks to the managing director, Sir James Ramsden, and the engineer, Mr. Stileman. Hitherto the flange rail laid in England has had but a poor chance in competing with the double or bull-headed rail, because nowhere has it been of equal weight, nor has its section been of good



GROWTH OF AUSTRIAN TRAINS, 1840-1890.

form for fishing the joints, nor has it had a steel base plate. America, where flange rails only are used, shows that plan of road to great advantage; for even admitting that their flange rails are weak, although they have lately increased their weight from 60 lbs. up to 80 lbs. per yard, their speed is quite as high as on the Continent of Europe, and their freight tariff is only half that of the English railroads, and still they pay a dividend. There is ample room, however, for increasing the weight of their flange rails still further, even up to 100 lbs. per yard, before they reach the cost of the English lines, notwithstanding that the centres of the sleepers are only 2 ft. apart on the American roads, instead of 2½ ft. on the English.

Development of Flange Rail.—But, as already pointed out, heavily worked railroads having flange rails would prefer to strengthen their present section of rail, rather than change it for a different form. It may be well therefore to consider what the flange-rail road formerly was, what it now is, and what it might be. When the author came to this country thirty years ago to inspect flange rails for the Swedish Government he made the improvement of the rail itself his special study. But he has since found out that he began improving at the wrong end, that is, from the top instead of from the bottom of the rail; and he is glad to have an opportunity here, as he had at the Paris congress, of correcting this error. The beginning ought to have been made at the base by fixing the rail to the sleeper more firmly; instead of this, he began by improving the rail joint, as then the most apparently weak point. Iron rails were then used of a pear-shaped section, with which it was impossible to get any vertical stiffness in fishing with plain fish-plates; and the joint was therefore supported by a sleeper with a sole-plate. But as this acted like an anvil, the badly welded rail ends soon became flattened and split like a broom. The sleeper was then taken away, and the joint was suspended between two sleepers. In order to obtain greater stiffness of the joint, the fishing angle had to be altered and the rail section to be reconstructed. . . . When steel came into use for rails, it became necessary that the form of section should be so modified as to take advantage of the nature of the new material in rolling; and the author was led to publish in 1878 a further series of standard sections for steel rails, with the height slightly greater than the width of base, and with a fish-joint of either angular or deep section. The fish-joints in the former series of standard sections for iron rails gave only one-third of the stiffness of the solid rail; but the new angular fish-joint gave two-thirds, and the deep fish joint gave stiffness equal to that of the rail itself. Both these later joints were tried on a large scale upon the Swedish State lines, and the one of angular section was there preferred to the deep joint, owing to the severity of the cold in winter. This has been the experience elsewhere as well, so that the angular fish is now the joint mostly used for flange rails, whereby notching of the rail flange is avoided. But the deep fish found preference in England with the bull-headed rail section, and has proved a great boon for realizing the present degree of perfection in obtaining a line of continuous stiffness.

American Flange Rail.—America has of late worked hard and in a very practical manner to establish fixed standard sections by appointing a committee for the purpose; and their full report just published will do a great deal of good to American engineers and railmakers. If the International Railway Congress in Europe would undertake such a task it would be of immense value. The main feature of the American standard rail sections is that the height is equal to the width of base, while in Europe the height is much greater than the width of the base. This makes the sole-plate all the more needed in Europe; but the author is convinced that it will before long be needed in America as well, although their bogie system of rolling stock is a great advantage in saving their track.

Another feature of the American standard section of rail is a flatter top, say 12 in. radius, and a sharp upper corner of the head. There is even one enthusiastic advocate for anabsolutely flat rail-head and cylindrical wheels. The 12-in. radius for the top may suit Europe as well; but even if any rail-head were made quite flat-topped, it would soon wear down to even less than a 12-in. radius, since the present conical tires worn to a rounded section could not all be converted in a moment into cylindrical wheels. The sharp upper corner of ¼-in. radius no doubt suits the American bogie vehicles; but as not half the rolling stock in Europe is yet fitted with bogies or radial axle boxes, it seems better to round the top corner a little more, so as not to risk running off on the curves. The lower corner of the rail-head is rounded with ⅛ to ⅜-in. radius in America. This corner the author now makes quite a sharp edge, in order to get the full bearing for the fish-plate; and he finds there is not the slightest difficulty to the maker. With this improved bearing of the fish-plate, the rail joint with angle fish-plates can be made equal in strength to the solid rail, as in the specimens exhibited. The great difference in the head of the Goliath rail is that it is made both wider and thinner than in the American rails generally, and has vertical instead of sloping sides, whereby two objects are attained: Firstly, greater durability, because the thick, narrow rail-heads have worn badly in consequence of their interior being less compact than the surface; and secondly, the wider rail-head approaching to the width of the wearing surface of the tire will give greater tractive power to the engine, and diminish or supersede the necessity of turning up both engine and carriage tires. The latest section of the Goliath rail is accordingly made with 3 in. width of head, for both flange and bull-head section.

Base of Flange Rail, and Fixing to Sleeper.—In respect lastly to the most important part, namely, the base of the flange rail and the mode of fixing it to the sleeper, there is here a very great difference from the chair, and the author regrets that most engineers have made the same mistake as himself in not beginning earlier to strengthen this part of the road; for while the rail joint is certainly a weak part of the road, the base is the weakest, as regards both safety of gauge and economy of sleepers. Happily, a stir is now at last beginning to be made in this matter upon the Continent. Valuable experiments on the stability of the rail, both vertically and horizontally, have been made by Mr. Brière, Engineer of the Orleans Railroad. Several voices beside the author's were heard at the Paris congress in favor of base plates. Mr. Bemelmans, Engineer of the Belgian State railroads, spoke strongly on the subject; and in reporting upon the pressure exerted on the rail by the rolling stock, he remarks that with the heavy engines now used each axle may carry 15 tons dead load or 7½ tons per wheel, while this load in running might from various causes be momentarily even double, or 15 tons per wheel. On a curve he considers that, beside the vertical pressure of 15 tons, the horizontal pressure on the outer rail may be half as much; and he calculates that the pressure of the outer rail on the sleeper is as follows: For the flange rail of the section used on the Northern Railroad of France, weighing 86 lbs. per yard and laid direct on the sleepers without base plate, 6.3 tons per square inch; for the Goliath rail of the section used on the Belgian State railroads, weighing 105 lbs. per yard and with base plate, 1.0 ton per square inch; for the bull-head rail used on the London & North Western Railroad, weighing 90 lbs. per yard and with chair, 0.3 ton per square inch. On a straight line he calculates the pressure on the sleeper in the same three cases to be: On the Northern Railroad of France, 1.3 ton per square inch; on the Belgian State railroads, 0.4 ton; and on the London & North Western Railroad, 0.16 ton per square inch. These figures explain why with a large traffic the sleepers, even of oak, where the rail is without base plates, are literally cut under the rail base, and are early rejected, not because they are decayed, but because the pressure is too great and the fastenings of wood screws or spikes are not strong enough to hold the rails to the gauge. On the Paris & Lyons Railroad, Mr. Michel, Engineer of the permanent way, has taken to base plates; the need of which is also proved in his report at the congress on the lines carrying express trains. With sleepers of softer wood than oak, such as fir or cedar, how much more valuable will the base plate be. No lengthened argument is wanted to show the necessity of the base plate for flange rails; all that is needed is to use common sense, remembering that a flange rail with base 5 in. wide, the widest that can be conveniently rolled, has not half the bearing surface of a chair on the sleeper. With comparatively light traffic the steel rail will last a long time, say 30 years; and in such cases it may fairly be asked why it should be made heavier so as to last 50 years. But the fir sleeper does not last more than seven years, and, what is worse, it is attended with great trouble in maintaining the gauge. Here, therefore, the base plate will be beneficial, only it must be large enough to give nearly as much bearing surface as the chair, and thick enough not to bend, and must be fixed to the sleepers beforehand, like the chair; and the rails must be fixed to the base plates by steel keys, as on metal sleepers, so as to obviate the necessity for extreme accuracy in the position of the holes in the base plate for the spikes and for the width of the rail base.

Influence of Speed on Safety and Economy.—As to speed, the author found by calculations made 20 years ago that the cost of construction of the different Swedish railroads was very nearly in proportion to the speed actually run on them; and in Table 3 is shown the widely differing proportion between weight of engines and weight of rails on the Continent and in England. In America this difference is still wider; engines of 60 to 70 tons and trains of 2,000 to 3,000 tons are carried upon a comparatively light road; there, however, the rolling stock is all on bogies, and also the weight is distributed on many more axles than in Europe, and the speed is lower. Thus the speed seems to be all important in regard both to safety and to economy, the American freight tariff, as already stated, being only half as high as the English. The distribution of the weight upon a greater number of axles, so as not to exceed a certain load upon each, seems to the author to be a true principle, only so long as the speed is slow. With high speed, say 60 miles an hour, he is of opinion that the rail between the supports of the sleepers has no time to regain its original position between the passage of each wheel, and hardly between that of each carriage, so that the weight of the whole train, or at least of the whole engine, acts like one single blow upon the rail from one rolling ball; and, therefore, it is the total weight of the engine that should properly be taken into account when running at high speed, and not the weight per wheel or per axle. With slow speed it is quite different; and when serving his time with our President at Cardiff the author remembers learning from him that the reason why he could take such heavy coal trains on the Taff Vale Railroad, without breaking the rails, was that the average speed was not more than 12 miles an hour. The extended experience of the President since that date enhances the value of his views on the effect of the rolling stock upon the rail, both as to safety and as to economy; and in following the lines of his recent admirable presidential address on the locomotive engine from almost its infancy, the author has much pleasure in giving his own experience on the rail question, after inspection of very large quantities. The present paper he hopes may be regarded as an expression of gratitude to the President for his unvarying kindness during a friendship of 30 years; and of the wish that the engineers of the two different departments, the rolling stock and the permanent way, may persevere in working together for the common good.

TABLE 3.

Comparison between Weight of Rails and of Engines.

F = Flange rail. G = Goliath rail. D = Double-headed rail. B = Bull-head rail.

RAILROAD.	RAILS. Description and weight in pounds per yard.	ENGINES. Weight in tons and number of wheels.
FRANCE.	Centres of sleepers 3 ft	.....
Nord	F 60 without base plate	39, 43¾, 47½, 51¾ on 8 wheels.
	F 86½ in 1887	
Est	F 60 without base plate	42 on 6 wheels.
	F 88½ in 1887	49 on 8 wheels.
Ouest	D 60 with chairs	38¾, 41½, 48 on 4 wheels and bogie.
	D 88 in 1889	
Orléans	D 76 with chairs	51, 55 on 8 wheels.
	D 84 in 1889	
État et Midi	D 76 with chairs	54 on 8 wheels.
Paris Lyon Méditerranée	F 68; F 78 in 1888	53, 57 on 8 wheels.
	F 94 in 1889 with base plate	
BELGIUM.		
État	F 68 without base plate	49, 52, on 8 wheels.
	G 105 in 1886 with base plate	
Grand Centr'l	F 68 without base plate	52 on 8 wheels.
ITALY.	F 72 without base plate	47.
	F 84 in 1889	
ENGLAND.	Centres of sleepers 2 ft. 6 in.	
London & N. Western	B 90 and B 82; with chairs 40 to 50 lbs. each	42 on 6 wheels.
Great Northern.	B 85	42 " "
Midland	P 85	43 " "
Great Western.	B 86	42 " "
Great Eastern	B 86	42 " "
North Eastern.	B 90	43 " "
South Eastern..	B 84	42 " "
London, Chatham & Dover.	B 84	42 " "
AMERICA.	Centres of sleepers 2 ft.	
Pennsylvania.	F 60 to 80 without base plate	60 on 8 wheels with bogie.

The Nicaragua Canal.

A reporter of the New York *Tribune* has had a lengthy interview with the President of the Nicaragua Canal Company, ex-Senator Warner Miller, from which we gather that the entire route has been carefully located and cross-sectioned, and the computed quantities of excavations, fills and embankments as determined by these studies are as follows:

	Cu. yds.
Earth dredging for canal, all below sea level	29,823,161
Earth excavation, all above sea level	21,773,810
Rock excavation	13,452,938
Rock excavation, under water	575,445
Total excavation, earth and rock	65,625,354
Rock fills, for dams and breakwater taken from divide cuts	4,033,810
Earth fills, taken from excavations	6,105,380
Concrete	615,651
Stone pitching	202,641

Borings which have been made through the entire length of the rock cut show that the rock is of sufficient solidity to hold at the proposed slopes.

The length and character of the work is summarized below:

	Miles.
Natural and artificial waterways, needing neither dredging nor excavating	101,939
Canal proper, through cuts	26,030
Excavation below surface of water to give 30 ft. depth of water, chiefly earth	40,720
Six locks	759
Total route from ocean to ocean	169,448

or stated in another way:

	East side. Miles.	West side. Miles.	Total. Miles.
Navigation in canal and locks	15,009	11,780	26,789
Free navigation in basins	.....	.....	21,619
Free navigation in R. San Juan	.....	.....	64,540
Free navigation in Lake Nicaragua	.....	.....	56,500
Total route from ocean to ocean			169,448

The principal operations on the canal are, as is well known, the breakwaters and harbors at San Juan del Norte, and at Brito the lock with a 45-ft. lift, a heavy rock cut 2¾ miles long and the dam across the San Juan River. Probably the only problematical portion is the harbor improvement at San Juan del Norte. The cost of all the rest can be estimated with approximate certainty. The work now in progress, aside from preliminary work, is at the harbor on the Gulf coast and a railroad thence towards the big lock and the rock cut.

Mr. Miller regards the purchase and removal of the Slavin dredging outfit as the last nail in the coffin of the Panama Canal scheme.

It is estimated that it will require six years to complete the canal, which will have 30 ft. of water throughout its entire length, and Mr. Menocal, the Chief Engineer of the Nicaragua Canal Construction Company, has sent to the fourth International Congress on Inland Navigation, lately held at Manchester, a paper on the Nicaragua Canal, its design, final location and work accomplished,

in which he put the total cost of the making of the canal at not more than $90,000,000, "exclusive of banking commissions, interest during construction and other expenses not included in the engineers' estimate."

In estimating the traffic of the canal, Senator Miller says: "If for the next seven years the steam fleet increases in the same ratio in which it advanced between 1881 and 1888, it will, in 1895, amount to 105,000,000 tons. Now, from statistical records it is possible to make estimates of the tonnage tributary to the new canal. They show that the traffic which would naturally seek the canal was, in 1879, 2,671,886 tons, and that in 1887 it had increased to 4,507,044 tons, a percentage of increase of nearly 69. Maintaining this rate of increase it would be, in 1895, 7,616,904 tons." In addition to this is the certain development of traffic between the Atlantic and Gulf coasts and the Pacific side of our country which is exampled by the fact that the tonnage passing Detroit in seven months is nearly as great as that entering and clearing from our sea ports in twelve.

The canal is calculated to have a capacity for an annual traffic of 20,000,000 tons. 28 hours being allowed for the journey of a vessel, allowing an hour and twenty minutes for detentions in narrow cuts. This will hardly give time enough to kill the barnacles. In addition to the through traffic a very considerable local traffic is expected to be developed, and Lake Nicaragua it is thought will be a sort of naval sanitarium.

Buildings and Structures of American Railroads*

SECTION TOOL HOUSES.

BY WALTER G. BERG.

Section tool houses or hand car houses are used for storing hand cars, tools and supplies required in connection with the construction or the maintenance of the track and roadbed on a railroad. They also afford shelter to the men during very heavy or prolonged storms and are, to a limited extent, frequently used as the section-master's workshop. There is usually one house for every track section of the road or for every regular track gang; in yards or at large terminals several houses or one large tool house are frequently used.

Section houses will be found located, as a rule, from three to ten miles apart, according to the local conditions on each road, the number of tracks and other controlling circumstances. The adoption of a standard design becomes very essential, owing to the frequency with which these buildings occur. Hence, there are but few roads that cannot show something in this line, although the methods employed differ considerably.

The general requirements for a section tool house are that space should be provided for the hand car and tools used by the gang on the track, in addition to which provision should be made for the storage of lamps, signal appliances, oil cans, and, to a limited extent, such supplies as rope, spikes, nails, track bolts, fish-bars, etc., without seriously blocking the floor space. Boxes, shelves and racks for storing tools, lamps, oil cans, bar iron, tool steel, etc., conveniently arranged, aid materially in keeping everything well assorted and yet confined to the least space. A small locker for the section foreman to keep blank reports, time books and other papers, and a short work bench, to be used at odd times for making light repairs to the outfit, will about complete the furniture. On some roads the tool house only serves for storing the hand car and the few tools in daily use, in which case a building slightly larger than the hand car suffices without any further inside fixings.

The location of the building should be alongside of a track. The most desirable site is at the head of a siding opposite the switch leading off the main track, the advantage being that the section-men can dodge in and out of the main track between trains with greater ease and less risk than if they had to lift the hand car on and off the main track. In yards or at stations this feature is preserved by locating the tool house near the head of the yard.

These buildings, with probably few exceptions, are frame structures, sheathed only on the outside and roofed with tin, shingles or corrugated iron. The designs in use differ mainly in the location of the large door and the position the hand car track occupies inside of the house. In all cases provision must be made to enable a hand car to be placed outside of the house without obstructing any tracks. Whether to place the door in the gable end or in the side of the building is a much-disputed question, which the width of the right of way available outside of the tracks will frequently determine. With a very limited right of way width the design with the door in the gable end and the building placed length wise with the track and close to it, will be the proper standard to adopt, as it takes up the least space crosswise of the right of way. The disadvantage is that the hand car must be turned on the platform in front of the house instead of running directly into the house after being lifted off the track.

If the house is small, the placing of the door to either side of the central line of the building is a good method to adopt, as otherwise the hand car, when in the house, seriously narrows the floor space on both sides. The best location for the door is near one end of the long side of the building. There should be, however, sufficient space left between the hand car and the nearest gable end for a man to pass, and also to allow the wall space along the gable to be used for racks to hold extra tools and sundry supplies. At the opposite gable end, tool boxes, shelves, lockers, and a short work bench could be located, leaving ample floor space for the men to move around freely and for the storage of miscellaneous supplies in small quantities.

*Copyright 1890, by Walter G. Berg, and condensed from a forthcoming book on the subject.

One or more small windows, closed either with a board shutter or sliding board sash, are useful for the admission of sufficient light to allow of the selection and assorting of materials, the cleaning of lamps and repairing of tools, etc., without having to depend on the open door for light, which would be objectionable in stormy weather. A floor of cinders or fine ballast serves for all purposes as well as a wooden floor, provided the location of the building will admit of good drainage.

While quite cheap in design, the Pennsylvania Railroad's tool house presents a very neat appearance. The Philadelphia & Reading Railroad's tool house ranks well in point of appearance, but it is hardly to be recommended for tool houses generally, except on sections of a railroad with heavy passenger travel. The tool house of the Union Pacific Railway is one of the best buildings for the purpose, unless a gable end standard is required owing to limited width of right of way. The general style of the tool house presented by W. B. Parsons, Jr., in his book on "Track," and the standard of the Atchison, Topeka & Santa Fe Railroad, are very similar to the design of the Union Pacific Railway. In the Cincinnati Southern Railway's section house, where the track enters on one side of the gable end, the floor space is not utilized as well as in the Union Pacific Railway's design. The Northern Pacific Railroad's plans belong to the cheapest structures shown; they are not intended for carrying much material or many extra tools in store, and are, therefore, small.

Relative to the size of these structures, the Pennsylvania Railroad has three standards, respectively, 16 ft. 2 in. × 30 ft. 2 in., 16 ft. 2 in. × 20 ft. 2 in, and 12 ft. 2 in. × 14 ft. 2 in.; the Cincinnati Southern Railway, 12 ft. × 16 ft. 8 in.; the Union Pacific Railway, 10 ft. × 14 ft.; the Atchison, Topeka & Santa Fe Railroad, 12 ft. × 16 ft.; design by W. B. Parsons, Jr., 12 ft. × 18 ft.; the Philadelphia & Reading Railroad, 10 ft. × 13 ft.; the Northern Pacific Railroad, 10 ft. × 14 ft.; the single hand-car house on the Northern Pacific Railroad. 9 ft. × 12 ft.

Descriptions and plans of the following tool houses are presented illustrative of the subject discussed in this article:

Standard Section Tool House, Pennsylvania Railroad.—The standard section or foreman's tool house of the Pennsylvania Railroad, shown in fig. 1, published in the *Railroad Gazette* of Nov. 12, 1880, is an oblong frame building with a double pitched gable roof; the sides are sheathed on the outside with upright boards and battens, the roof being covered with tin. There are three standard sizes in use, viz., size "A," 16 ft. 2 in. × 30 ft.

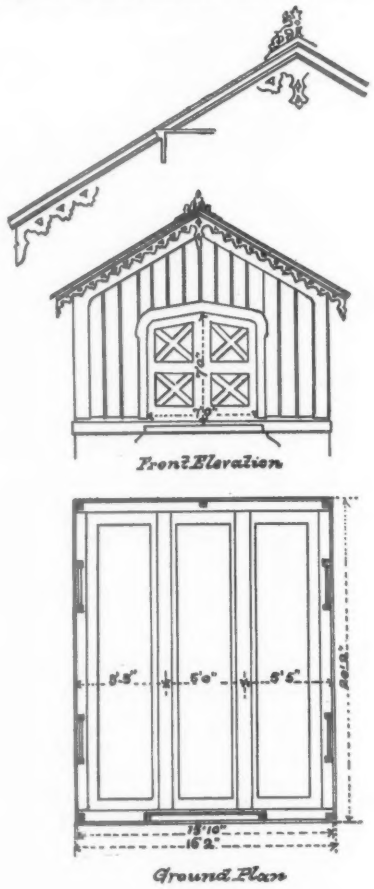


Fig. 1 a.

2 in.; size "B," 16 ft. 2 in. × 20 ft. 2 in.; size "C," 12 ft. 2 in. × 14 ft. 2 in. The building is placed either with the gable end or the side facing the tracks, according to the space available between the outside track and the right of way line. In all cases a large door for admitting a hand car is provided at the centre of the gable end. The details of the door and window casings, corner boards, cornices and gables, are simple, but very neat.

Size "B" is shown on the plans mentioned. Size "A" is substantially similar in design, except that a third window is added on each of the long sides. The buildings are generally placed on a stone foundation wall, which is, however, omitted on branch roads. There are stone walls under the rails forming the hand-car track inside the house, which walls serve also to support the floor joists. The principal dimensions are as follows: track stringers, 5 in. × 12 in.; floor joists, 5 in. × 8 in.; 2-in. floor, top of floor flush with top of rail; sills, 5 in. × 8 in.; corner posts, 5 in. × 6 in.; door and window studs, 3 in. × 5 in.; plates, 4 in. × 6 in.; rafters, 3 in. × 6 in., spaced 30 in. between centres; collar, 2 in. × 4 in.; tie beam, 2 in. × 6

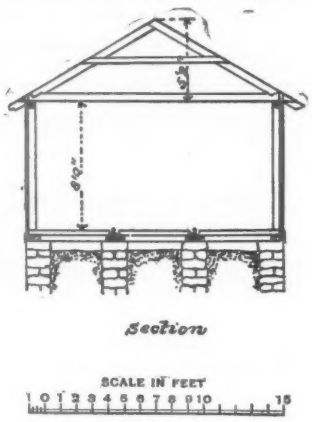


Fig 1 b.

in.; windows, four lights, each 10 in. × 16 in., with shutters; door, 7 ft. × 7 ft., in two sections, hung on rollers; height from top of floor to bottom of tie beam, 8 ft.

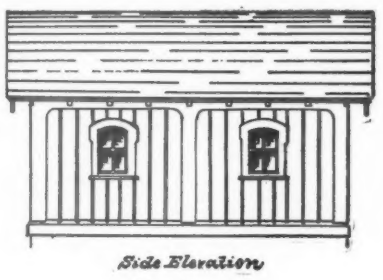


Fig. 1 c.

There are two lines of nailing pieces between the upright studs, and also angle braces at the corners of the frame.

In size C there is only one window on a side, and the door is single, hinged, 3 ft. 6 in. wide. The floor is made of 2-in. plank, laid on regular floor joists crosswise of

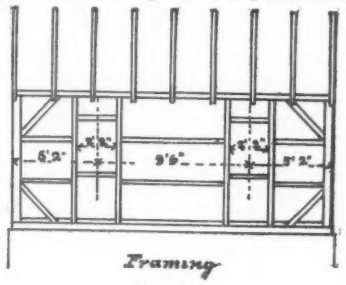


Fig. 1 d.

the building, 3 in. × 12 in., and spaced 15 in. between centres. This standard is only used where a hand car need not be housed.

Standard Section Tool House, Union Pacific Railway.—The standard section tool and hand-car house of the Union Pacific Railway, shown in fig. 2, is a frame build-

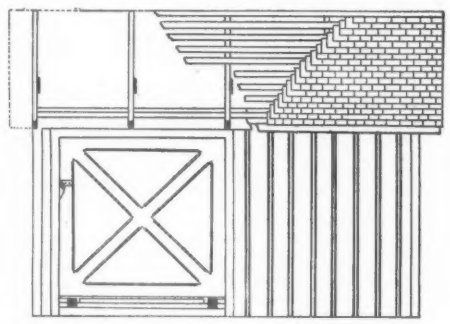


Fig. 2 a.

ing, 10 ft. × 14 ft., with a double pitched gable roof. The building is sheathed on the outside with vertical boards and battens; the roof is covered with shingles. The

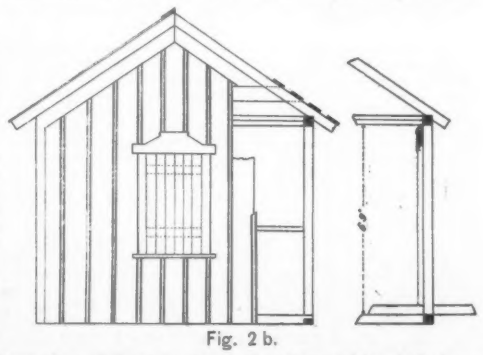


Fig. 2 b.

large door, 6 ft. × 6 ft., for the hand car, is situated at one end of the long side of the house facing the track. At each gable end of the building there is one window, 2 ft.

×3 ft. 7 in., without sash, but closed with a board shutter hinged on the outside of the building. The height of frame from top of sill to top of plate is 6 ft. 9 in.

The principal sizes are as follows: sills, 4 in. × 4 in.; plates, 2 in. × 4 in., double; cornerposts, 4 in. × 4 in.; studs, 2 in. × 4 in.; door studs, 2 in. × 4 in., double; nailing pieces, 2 in. × 4 in.; rafters, 2 in. × 4 in., spaced 42 in. between centres; collars, 1 in. × 6 in.; roof boards, 1 in. × 6 in., laid open; sub sills, 2 in. × 6 in.; rails for hand car

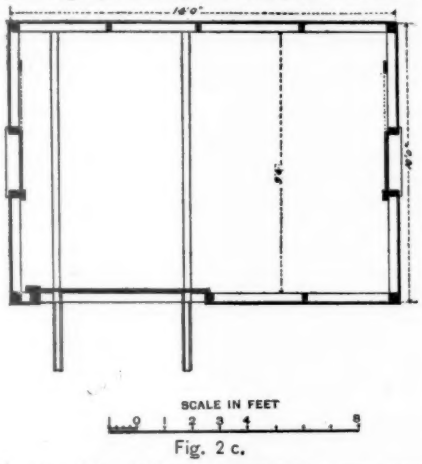


Fig. 2 c.

track, 4 in. × 4 in., laid on the ground; corner boards, ⅞ in. × 4 in.; frieze, ⅞ in. × 10 in.; door rails, 2 in. × 6 in.; door styles, 2 in. × 8 in.

Standard Hand-Car and Tool House, Cincinnati Southern Railway.—The standard hand-car and tool house of the Cincinnati Southern Railway is a frame building, 12 ft. × 16 ft. 8 in., with a double-pitched gable roof. The building is sheathed on the outside with vertical boards and battens, and roofed with shingles. The door for the hand car is located on one side of one of the gable ends of the building; its size is 7 ft. × 7 ft., in one piece, and hinged on one side. There are no windows whatever in the building. The height of frame from top of floor to bottom of tie beam is 7 ft. 2 in. The hand-car track, entering on one side of one of the gable ends of the building, remains on that side in the building, while the balance of the floor and wall space on the opposite side is reserved for storage of tools, lanterns and sundry materials. For this purpose there are two boxes, each 6 ft. long, 2 ft. 6 in. wide and 2 ft. 6 in. high, and a set of shelves.

The principal sizes used are as follows: foundation posts, 8 in. × 8 in.; sills, 4 in. × 4 in.; corner posts, 4 in. × 4 in.; door studs, 4 in. × 4 in.; intermediate studs on long sides, 2 in. × 4 in.; plates, 2 in. × 4 in., double; rafters, 2 in. × 4 in., spaced 24 in. between centres; ridge piece, 2 in. × 6 in.; tie beams at every other set of rafters, 2 in. × 4 in.; roof boards, 1 in., laid close; angle braces at top and bottom corners of frame, 2 in. × 4 in.; outside boarding, 9 in. × 1 in.; battens, 3 in. × 1 in.; board at end of rafters, 8 in. × 1 in.; door, 1 in. boards; door rails, door styles and angle brace of door, 8 in. × 1½ in.; barge board, 7 in. × 1 in.; floor, 2-in. oak. The floor and the rails for the hand car track rest on 6 in. × 4 in. mudsills, laid on the ground, 4 ft. apart. The top of the rail is 2 in. above the top of floor.

The contract price for these standard tool houses, erected complete in place, was $75—at the time the Cincinnati Southern Railway was built, about 1878 to 1880.

Standard Tool House, Atchison, Topeka and Santa Fe Railroad.—The standard tool house of the Atchison, Topeka & Santa Fe Railroad is a frame building, 12 ft. × 16 ft., with a double pitched gable roof. The outside is sheathed with upright boards and battens; the roof is covered with tin. The door for the hand car, 6 ft. × 6 ft., hung on rollers, is located at one end of the long side of the house facing the track, similar to the design for the tool house of the Union Pacific Railway, shown in fig. 2. In each gable end there is one window opening, 2 ft. 6 in. × 2 ft. 6 in., closed by a sliding board sash. The height of frame from the bottom of sill to the top of plate is 8 ft.; the top of floor is one foot above the bottom of sill and consists of boards laid on joists. There is no special track in the house or outside of it for the hand car. The long side of the building is placed parallel with the track, 12 ft. distant from the nearest rail. The standard plan shows pile foundations, three lines with four piles each; one line under each gable and one line across the middle of the building. The space between the front of the building and the nearest track rail, 12 ft. wide and 16 ft. long, is covered by a platform having a fall from the building toward the track.

The principal sizes are as follows: sills, 4 in. × 4 in.; corner posts, 2 in. × 4 in., double; studs, 2 in. × 4 in.; plates, 2 in. × 4 in.; nailing-pieces, 2 in. × 4 in.; rafters, 2 in. × 4 in., spaced 27 in. between centres; tie beams, 6 in. × 1 in.; angle braces at top and bottom corners of frame, 2 in. × 6 in.; joists, 2 in. × 6 in., spaced 20 in. between centres, spanning 8 ft.; floor, 2 in. boards. Pitch of roof ¼.

Tool-House Design from Parson's book on "Track."—W. B. Parsons, Jr., formerly roadmaster Susquehanna Division, New York, Lake Erie & Western Railroad, gives in his book on "Track" a design for a tool house, the characteristic features of which are described below. The building is a frame structure, 12 ft. × 18 ft., with a double pitched gable roof; sheathed on the outside with vertical boards and battens, and roofed with No. 24 galvanized corrugated iron. The large door for the hand car, 6 ft. 9 in. square, hung on rollers, is situated at one end of the long side of the building facing the track, similar to the arrangement on the Union Pacific Railway and the Atchison, Topeka & Santa Fe Railroad. In each gable end and on the side of the house away from the track, there is a window with a sliding sash, 4 lights, each 10 in. × 12 in. There is no special track or stringers for a hand car inside of the house. The floor is laid on joists. The height of frame from top of floor to bottom of plate is 6 ft. 10 in. There is a 2-ft. work bench and a locker located at the gable end of the building away from the door.

Standard Tool House, Philadelphia & Reading Railroad.—The standard tool house of the Philadelphia & Reading Railroad is a frame structure, 13 ft. × 10 ft., shown in ground plan in fig. 3. There are quite a number of alternative designs for the exterior of these buildings adopted as standards, so as to avoid sameness of design along the road; the general features and the ground plan, however, remain the same in all cases. One of these alternatives, shown in fig. 4, has a double pitched gable roof with a false front and shed roof extension over the large door. Another design shows a hip roof. The buildings in all cases are sheathed on the outside

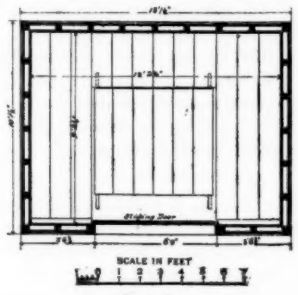


Fig. 3.

with narrow, tongued and grooved boards, put on diagonally, vertically or horizontally, which, in connection with the corner boards, base boards, frieze boards and panel boards, cause the exteriors of these buildings to

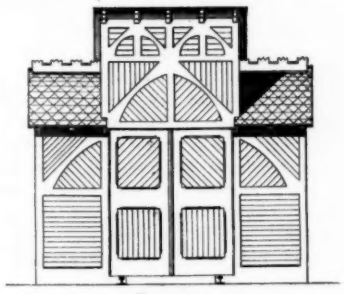


Fig. 4 a.

present a very striking and tasteful appearance. The inside of the building is ceiled close. There are no windows at all. The door is located at the middle of the long side next to the track, is 6 ft. wide, in two sections, hung from above and sliding sideways. The floor is

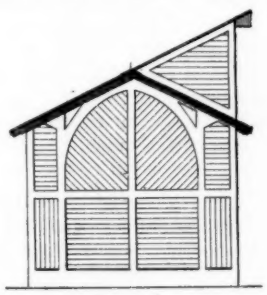


Fig. 4 b.

formed of boards on joists. The roof covering is tin or slate, frequently laid, or painted, according to an ornamental design, and finished off with galvanized iron cornices, ridge rolls and finials.

Section Tool House, Northern Pacific Railroad.—The standard section tool house of the Northern Pacific Railroad, shown in fig. 5, is a frame structure, 10 ft. × 14 ft., with a double pitched gable roof, sheathed on the outside with horizontal weather boarding, and roofed with shingles. The large door for the hand car is situated in the centre of the long side of the building facing the track; it is 6 ft. wide, in two sections, hinged on the outside of the building. There is one window in the house opposite the entrance. The height from the top of sill to the bottom of plate is 8 ft.

The hand car track inside of the house is formed of

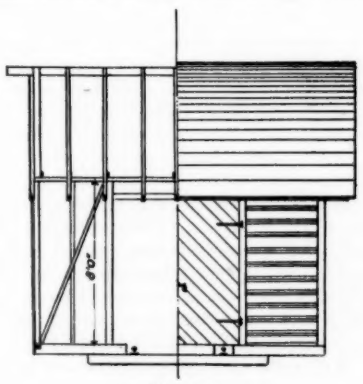


Fig. 5 a.

rails on cross ties. Along each gable end of the house there are racks and shelves for stocking tools.

The principal sizes used are as follows: sub-sills, 6 in. × 8 in.; sills, 6 in. × 6 in.; door studs, 4 in. × 4 in.; braces, 2 in. × 4 in.; studs, 2 in. × 4 in.; plates, 2 in. × 4 in.; ceiling joists, 2 in. × 4 in.; rafters, 2 in. × 4 in.

The standard single hand-car house of the Northern Pacific Railroad, with accommodations for one hand car, adopted on some sections of the road in place of the design shown in fig. 5, is a frame structure, 9 ft. × 12 ft., sheathed on the outside with vertical boards and battens and roofed with shingles. The large door is at the gable end of the building facing the track; it is 6 ft. wide, in two sections, hinged on the outside and swinging outward. The building is placed with the gable end facing the track, 15 ft. distant from the nearest rail. This space is covered by a platform, the same width as the house, and sloping down toward the track. The height of frame from floor to top of plate is 7 ft. There are no windows in the house.

The principal sizes used are as follows: sills, 6 in. ×

Fig 5 b.

6 in.; floor joists, 4 in. × 8 in., spaced 27 in. between centres, spanning 12 ft.; plates, 2 in. × 4 in., upright; rafters, 2 in. × 4 in.; floor, 2 in.; joists under platform,

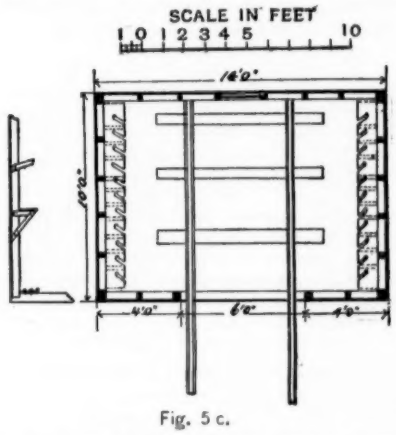


Fig. 5 c.

2 in. × 8 in., spaced 27 in. between centres, spanning 12 ft.; hand car track rails, 2 in. × 3 in., nailed on top of flooring.

Tool House, Lehigh Valley Railroad.—The tool house of the Lehigh Valley Railroad, in use on the New Jersey Division, shown in figs. 6 and 7, designed by C. Rosenberg, Master Carpenter, New Jersey Division, L. V. R. R., is a frame structure, 16 ft. × 20 ft., ceiled on the inside with 1 in. boards, sheathed on the outside with beveled weather boarding, and roofed with slate on

Fig. 6.

boards. Inside there is a small space, 8 ft. × 6 ft., partitioned off for the foreman. In the front gable end there is a small door and a large sliding door for hand cars. On each of the sides of the building there are two windows. At the back of the room there is a brick flue and a small work bench. This building can accommodate several hand cars and push cars, and offers storage space for a considerable quantity of track tools and mis-

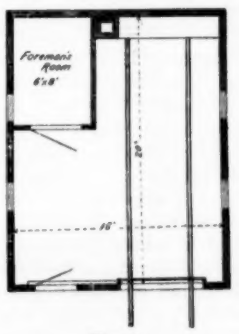


Fig. 7.

cellaneous supplies. The design does not offer any particularly new features, excepting the special inclosure for the use of the foreman, which is to be recommended wherever foremen are expected to do considerable clerical work in connection with reports, etc. It also affords an opportunity to lock up special supplies and more costly articles, keeping them thus distinct from the general stock that all the men have access to.

The Kingston Dry Dock.

The Canadian government has decided to authorize the widening of the entrance of the Kingston dry dock from 48 to 55 ft., so as to make it available for use by vessels of the largest size.

RAILROAD GAZETTE

Published Every Friday,
At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The principal feature of the strike during the past week has been the absurd conduct of the daily newspapers, especially those of New York City, in printing at great length the movements and sayings of the strikers and their leaders. One of the first exhibitions of silliness on the part of the newspapers was the printing by the New York *Herald*, week before last, of two or three columns of interviews with railroad presidents and managers all over the country concerning the merits of the strike. Each and every one of these men had given little thought to the matter, and refused to express even that little. The New York *Tribune*, although one of the chief offenders, was fair enough to print a communication from a reader calling attention to the evils of "over-publicity." The strike was practically over in a week. The strikers could do no further harm, except on roads other than the New York Central, and they evidently would not attempt that without the aid of the other brotherhoods. There was no prospect at any time that this aid would be granted, and yet the headlines attached to the daily dispatches led hurried readers to believe that disturbance was still to be expected on the New York Central. Mr. Powderly, after asking an interview with Mr. Webb, went off to Buffalo (to get the switchmen's sympathy) before Mr. Webb had a chance to see him, thus evincing a queer kind of anxiety for a settlement. His other acts were such as to convince the newspapers of his insincerity; but they were convinced only in the editorial columns, and allowed the news columns to be filled up by reporters who ought to have been "resting up" for their autumn work.

The right of organized labor to be heard, the duties of the state and of railroad officers, and other questions connected with the strike, have been fully discussed by the daily press, and generally with much good sense. The most serious secondary question is that connected with police protection as brought up by the lawlessness at Albany. Mr. Powderly argues that there is an ample force of militia ready to maintain order if the railroad company applies for the protection; but he should remember that the military are to step in only when civil authorities have tried to maintain order and have failed, and at Albany it looks as though the civil authorities hardly attempted to maintain order. So far as we can judge, the state of things at Syracuse a week earlier was about the same. It appears that some, at least, of the Pinkerton men were duly appointed as officers of the law, but we believe it is admitted that not all of them were thus appointed; and apparently many of them were not fit for police duty, whether they had the authority or not. The railroad company is wholly inexcusable for employing any but discreet men to handle firearms; and men properly qualified should be given such power only through the police authorities; but the public, in condemning the railroad officers for wrongdoing in this connection, should remember that the only alternative of a railroad company whose line lies through a city where the civil authorities are inefficient is to stop running its railroad; and the financial loss to the road from such a stoppage is, after all, a small matter compared to the damage thus inflicted by the public upon itself. This is only another outcropping of the same general state of things that railroads have to contend with constantly, as illustrated in the utter inefficiency of the local authorities in many places in keeping vagrants off railroad premises.

Another fact brought into strong light by the strike, which, though not new, should have more careful consideration, is the insufficiency of railroad yards as compared with the capacity of the main line. The Central is not worse than many other roads—perhaps most of them. The capacity of its main line for the passage of freight trains is almost unlimited, but that of the yards is so fully taxed under normal conditions that a very small disturbance upsets business for a long time. At the Grand Central Station in New York City the tracks are so fully occupied, and switching trains are so frequently crossing each other's paths, that a strike of one-fifth of the force would probably disturb traffic seriously at any time. The freight yards have so little storage capacity in proportion to the number of cars that they must handle every day that a blockade of two days is likely to hinder a good portion of the freight from five to ten days. This is generally not a question of capacity simply, but of capacity and arrangement. The correct principle in laying yard tracks is to have a large number of short tracks rather than a smaller number of long ones, so that any one car can be got out at any time without excessive switching. New yards are, indeed, laid out on this plan, but the occurrence of such a blockade as this one, not to mention the smaller difficulties encountered every year and the disarrangements by snow in winter, which the public more readily forgive, should bring up the question of altering and enlarging old yards as well as adopting the right principles in new ones. Every railroad can get cheap land somewhere on its line, and yard tracks for occasional use need not be expensive; while a serious delay to several thousand shipments is expensive not only in money but in reputation.

There have been within the past 10 days a half dozen strikes or threats to strike, besides the New York Central affair, and several "demands" of less consequence; and people speak of an "epidemic." What are the causes of this state of things? So many disturbances at once must be taken as a strong indication that the men are influenced by the feeling that a policy of mere annoyance will attain their ends with the companies. The fact that disturbances on another road will tend to prevent the securing of new men seems to be relied upon as a means of extorting concessions, regardless of any question of right and wrong or of the usual laws governing these transactions. It would seem to be useless to waste further talk at present about the lessons that the men should learn, for their present action shows the blindest disregard of past lessons. The lesson for the railroads is that men who are so short-sighted and so blind to their own interests, as well as to the demands of justice, must be replaced by those possessed of more reasonable dispositions as well as more honor. Although railroad officers have often pursued a short-sighted policy, and have in many cases been overbearing and unjust, the strikers far excel them in all these foolish traits. To discharge a body of strikers, and hire in their places a similar body of men of the same grade of intelligence and honor, is not an adequate remedy. That is what has been done in many strikes heretofore, but the simple lesson concerning supply and demand taught by this does not seem to be learned by employés or to tend to a permanent cure. Previous victories have indeed proved that on the mere basis of supply and demand a company can get men at present prices and may thus resist the demand for an increase; but is not this in the long run a failure? In times of peace we talk about fostering permanency of employment, about a company securing the friendship of its men with a view to retaining their loyalty, and about increasing their wages so as to enhance their efficiency. It looks as if some of these fair-weather doctrines would have to be put in practice in order to prevent storms. It is plain that cool-headed men who will not be misled by demagogues are needed to handle cars of hogs as well as to sell tickets or handle money. The reason engineers do not enter into strikes as rashly as do these "switchmen" is not simply because they belong to a stronger brotherhood, but also because they have been educated to (or have been born with) a higher degree of intelligence. Securing loyalty, and friendship, etc., is only accomplished by getting moral intelligence, and that cannot always be bought at the prices paid for mere dexterity in coupling cars and handling brakes.

We are very glad to print, in another column, Mr. Hammond's letter emphasizing his reasons for modifying standard practice in signaling. We recognized these reasons and said so, and therefore must decline his challenge to advise him in detail how to make a large yard out of a small one. As for enginemen, we spoke of runners in general; his particular men now in service have undoubtedly improved, as he says. Variations from strict uniformity often make no trouble for many years. As we have evidently displeased Mr. Hammond by a lack of enthusiasm in considering the difficulties he had to contend with, we will here mention, what we omitted last week from oversight, our enthusiastic admiration of the successful way in which a big day's work was done on the first day the new signals were used. The first few days' experience at such a place, with engineers who have never worked with interlocking, is almost invariably a series of delays or of dangerous movements in disregard of signals; but in this case the 500 movements, more or less, involved in a summer day's work were smoothly performed the first day. This gives evidence of methods of training the men which many a large road would do well to imitate.

That brake shoes need inspection before being put into service is evident from a knowledge of their defects and the annoyances resulting from the use of inferior shoes. Recently, in a reported case of brake failure, after an examination of all the pipes, triple valves and connections, together with the brake leverage and air gauge in a search for the cause of loss of braking power, it was at last discovered that the new brake shoes did not fit the wheels and were covered with bunches such as are common on rough castings. It was also found that the brake-beam springs, being made from steel that *happened* to be in stock, were so stiff that the brake-beam pressure remaining after the force of the springs was deducted was not sufficient to hold the train while the shoes had so little contact on the tread. Shoes will be "out of true" and have uneven surfaces even when cast with the utmost care, and it is not to be expected that a new set of shoes will afford their maximum power until they have been brought down to a bearing by actual contact for some time with the identical wheel tread upon which they are to operate. But although it may be right to accept shoes that are not precisely true, that is no reason why they should be accepted or used when they are covered with unnecessary bunches or when they do not fit the circle of the wheel. Inspection alone can determine the probable holding capacity of new shoes, and in every case the shoes for a passenger car truck should be carefully selected, and, when *actually in position on the brake beam*, should be pressed against the wheels to determine if they are square with each other, and if both bear almost uniformly on the wheels at the same time. The strength of brake-beam springs ought not to be carelessly determined; they should be uniform and of only such stiffness as is required to keep the shoes away from the wheels when the brakes are off. In the case above referred to the springs of one beam were so stiff that a powerful man with a long lever could not bring the beam forward to a bearing position on the wheels. The loss of braking power was, of course, considerable, and this loss, added to the loss caused by the decreased friction of the shoes, resulting from the uneven bearing, was sufficient to cause a brake failure. These are good examples of the effect of errors in the many small mechanical details of a modern railroad train, and show very clearly how defects in apparent trifles may result in the failure of the train to make schedule time or to be controlled when danger is imminent.

Lateral Motion Trucks—Their Vertical Movements and Lateral Resistances.

II.

In the *Railroad Gazette* of Aug. 22 the vertical rise of a swing motion truck was considered, and a diagram was given showing the variation in this motion. We will now consider the lateral pressures resulting from such rise. It will be noticed that the curves of rise for various combinations correspond approximately to circular arcs. In some cases they are true circular arcs; in others two arcs of different radii correspond more nearly to the exact shape. Also, it is shown that the rise of the engine per inch of lateral displacement increases as the displacement increases; and in the case of the line *O A*, which represents the rise when the links are diverging at the bottom, and with a flat

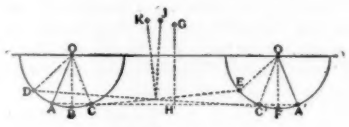


Fig. 4.

Fig. 3. Fig. 2.

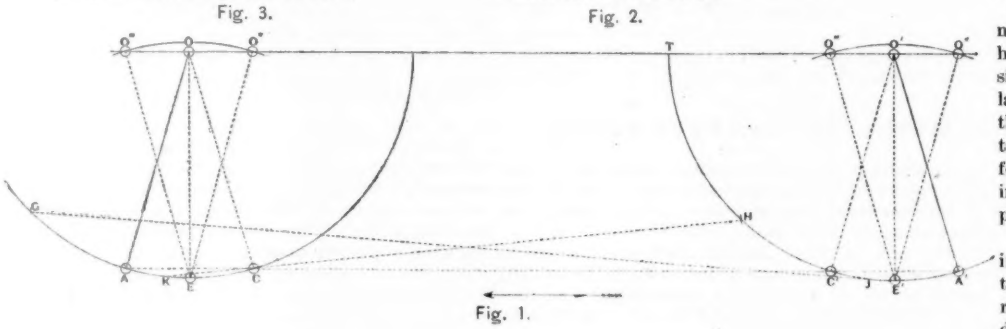


Fig. 1.

centre pin, the increase in rise with the increase of lateral displacement is considerable. The least increase is obtained, as represented by the line *O D*, when the links are converging and the bearing is made on a pivot. But the increase when the links are parallel is about the same as that shown by the line *O E*.

The rise of the front of the engine when the links are diverging, or spread, at the bottom is greater for a given lateral displacement than when the links are converging. The reason of this is not clear without some explanation. The diagram, fig. 4, illustrates this: *O* and *O* are the upper centres, and *A A'* and *C C'* the lower centres. Take the case of a pivot centre located at *G* when in the normal position. It is on a line *G H* drawn perpendicular at the centre of the line *B F* with diverging links, which are those spread at the bottom; let the point *A'* move to *F*, then *A* will move to *D*, and the point *G* will be found at *J*. In the case of the converging links, which are those hung inside, let the point *C* move to *B*, the same lateral distance as in the preceding case; then *C'* will travel to *E* and point *G* will be found at *K*. Here it is seen that while the points *J* and *K* are about at the same distance above *G*, yet they are displaced laterally a distance *J K*, showing that with converging links the lateral motion of the centre pin is greater than the lateral motion of the bottoms of the links, while in the case of the diverging links the opposite is true, and the lateral motion of the centre pin is less than the lateral of the bottom of the link. Hence, as seen in fig. 4, by the relative positions of the points *K* and *J* with reference to the point *G*, there is a greater lateral displacement for the same rise in the case of the converging than with the diverging links. This explains the difference in the location of the curves in fig. 2.

Of course, the greater the distance through which the front of the engine is lifted for a given lateral displacement, the greater will be the pressure required to lift it, and therefore the greater the lateral pressure on the rail and the greater tendency of the engine to return to the central position. To determine the amount of this pressure it is necessary to note the rate at which the engine is rising compared with the rate of increase of lateral displacement. This is rather complicated when expressed mathematically, but when determined by measurement on the diagrams is easily obtained.

The lateral pressures are proportional to the tangent of the angles which the direction of curvature at any point makes with the horizontal line. The method of describing these pressure curves is as follows: Take any curve, as *O A*, fig. 2, and draw tangents at various points. This can be done readily by making the tangent lines perpendicular to the approximate radius of curvature at the different points. Select any point near the diagram, as *X*, fig. 3, and draw the radiating lines, as *X Y*, parallel to the tangents just described. Draw the vertical lines *Z Y* 1 in. from *X*, then the distances *Z P*, *Z Y*, etc., represent the rise of the engine for 1 in. of displacement at the various points on the curve *O A*. The rise takes place at the rate which it would if the engine were sliding up an inclined plane located at angles corresponding to the various tangents. For instance, a tangent at the curve *O A* at the point *Y* has the angle to the horizontal line indicated by *Z X Y*, fig. 3. Therefore, at the point *Y*, fig. 2, the engine is rising as rapidly as if it were sliding up a plane with the inclination *X Y*, fig. 3.

The pressure resulting from the rate of rise bears the same ratio to the weight on the front truck of the engine as the amount of the rise at that rate bears to the lateral displacement which produces the rise. That is, the lateral pressure is to the weight of the engine as *Z Y* is to *Z X*. *Z X* being unity, then *Z Y* represents a factor which if multiplied by the weight of the engine on the front truck would give the lateral pressure. The vertical line, as well as the horizontal diagram lines on these diagrams, are one-half inch apart. Therefore, the point *Y* is seen to be about $2\frac{8}{10}$ in. above the horizontal line, and if the weight on the front truck was 18,000 lbs., the lateral pressure due to the rate of rise on the curve *O A* at the point *Y* would be $2\frac{8}{10}$ times 18,000, or 39,600 lbs.

It is in this manner that the various curves in fig. 3 are determined, and the wide difference between the different methods of hanging two wheel engine trucks is indicated. One marked peculiarity is noted. The line *O B* falls below the point *O* on the base line, which indicates that, with diverging links and pivot bearing of the dimensions here given, there is less than no lateral pressure at the central point, and therefore the engine has a tendency to swing off of the centre at the start, and only covers a neutral position when at either side of the centre about one-fourth of an inch.

The location of the centres of the approximate circular arcs is indicative of the initial lateral pressure and of the undesirable results just mentioned and shown by the curve *O B* at the point *O*, fig. 3. The centre for *O B*, fig. 2, is located at *Q*, and is on the left of the vertical line drawn from *O*. This teaches that the engine must drop a little in passing from the centre either way, whereas, on the other hand, the centre of curvature for *O F* is located at *R* at a considerable distance to one side of the vertical line at *O*, and therefore the engine must commence to rise immediately after leaving the centre. This gives the initial pressure represented by *O M*, fig. 3.

Here, then, a wide difference is seen in the amount of lateral pressure for equal amounts of lateral displacement. It is clear that with diverging links and the Pennsylvania style the increase in lateral pressure is greater as shown by the lines *O A* and *O B* and *O F*, fig. 3, than with the converging links, as shown by the lines *O C* and *O D*. It will be noticed also that beyond a certain lateral displacement, say at the eighth division, there is an extremely rapid increase in pressure in the case of the Pennsylvania type, whereas with the links parallel, as shown by the line *O E*, this rapid rise does not take place until the twelfth division is reached, showing that with the links parallel a greater lateral displacement is possible and the truck is much more flexible. Whether such flexibility is desirable or not will be discussed later.

In fig. 3 a peculiarity in the extremities of the curve at *O M* will be noticed. They do not all reach a zero of lateral pressure when at the centre, and this indicates that there is some initial lateral pressure tending to keep the engine in a central position, and that when it first starts to move from the centre it has resistance to overcome. This is true, as will be readily seen, of the Pennsylvania type and of the types with inclined links when a flat centre is used. With the parallel links there is no initial lateral pressure, and the engine is free to move some little distance each side of the centre without meeting any considerable resistance.

In fig. 3 are other lines showing different types of support than those just mentioned. For instance, there is a type which is made with a roller at the centre which rolls up an inclined plane. This gives a uniform lateral resistance for all lateral displacements. The side pressure is the same for 2 in. displacement as for three, hence the pressure line would be a straight line parallel with the base, as shown at *M L*, fig. 3.

In the case of the radial axle box, the engine does not rise, but the spring placed each side of the centre has an initial tension. Supposing this initial tension to be equal to *O M*, then *O M* will be the initial lateral resistance. The increase in resistance above the initial resistance will be in proportion to the distance which the engine is displaced laterally. Therefore, a line, such as *M K*, will represent the increase in lateral resistance with an increase in lateral displacement.

If the truck be hung upon parallel swing links and in addition there be used a set of springs to increase the lateral resistance, then there would be the initial resistance *O M* and an increase in lateral pressure for different displacements shown by the curve line *M J*, which is a combination of the line *O E* and the line *M K*, it being evident that both the spring and the action of the swing links will tend to increase the side pressure.

As to whether an initial resistance is necessary or not, there is no good ground for dispute; the balance of opinion is decidedly in favor of such an initial resistance, and it accords with good reason. It is not desirable that the front end of the locomotive move laterally except when necessary. Too much freedom at the front allows the locomotive to oscillate and remain out of centre, the effect of which is to cause flange wear, and it is one of the most prolific of all the conditions that produce such wear; it is equivalent to moving the centre pin of a rigid truck out of centre. Now no one for an instant would think of placing a truck out of centre with the centre line of the front end, and if done all would expect to find the front drivers and the truck with worn flanges. Parallel swing links for an engine truck will bring about this result in this way: There is almost no resistance made when the front of the engine hung on parallel links swings one inch either way from the centre, except that due to the friction of such movement. If in this condition the engine leaves a curve the chances are that the truck will not return to the centre because of the friction of the links, but remain with the wheels grinding against the inner or outer rail, as the case may be. Therefore it is highly desirable that there be some initial lateral resistance which will overcome the friction and bring the engine exactly to a central position whenever it leaves a curve or is displaced from any other cause.

In another issue will be given conclusions that may be drawn from the foregoing arguments and diagrams.

The Interstate Commerce Commission Statistical Report.

Statistician Adams' annual report for the year ending June 30, 1889, from which we printed copious extracts last week, is valuable chiefly as a work of reference. The facts given are so important and are so condensed, and moreover are gathered from such a varied field, that discussion of them can properly be undertaken only piecemeal. It is to be remembered that it has been questioned whether roads lying wholly within one state are amenable to the national laws regulating railroads; all companies have been asked to report to the Commission, and as it cannot be called a stretch of authority for the Commission to assume that all common carriers do some Interstate business, this requirement is to be regarded as not unreasonable. Whether the mileage and statistics which Professor Adams is compelled to report as unofficial are those of roads which refuse to report for the above or other reasons, we do not know. While, as above intimated, the figures of this report cannot be lightly handled, it is worth while to note some of the differences between the conclusions of *Poor's Manual* and those of the Commission's statistician. We noted some of the differences in these reports a year ago.

For example, the rates obtained per ton mile in cents were:

	1888.	1889.
Poor	0.977	0.976
Interstate Commission	1.001	0.922

Poor's average is rightly higher than the Commission's

for 1889, because Poor's figures are based upon the fiscal years of the companies, which in many important cases include the last six months, these being much more profitable than the first six or the corresponding months of 1888; but this explanation is hardly adequate to account for the fact of the great difference in the Commission's rates for the two years as compared with the small difference in the *Manual's* figures.

Another serious difference is in the length of haul. In Poor's tables, published in our issue of Aug. 1, it was shown that the average freight haul had been nearly stationary for a number of years—about 110 miles. Prof. Adams figures out a haul of 127 miles. If our average haul is increasing, it points to a very important fact—that the long haul, or competitive tonnage, is increasing faster than the local. We know that the local is steadily gaining upon the through on many roads, such as the Lake Shore and the Chicago & Northwestern; it is very doubtful whether the contrary is true of the country at large. Whether the traffic be competitive or non-competitive, the cost per ton per mile, as we all know, is materially reduced by every change which gives a shipment for a whole trip in place of one for or from a way station, and it would be of great interest to know whether these figures actually indicate such changes or are simply the result of some change in through billing or correction of former methods of reporting.

The average train load is given by the Commission's statistician as 179 tons and the average number of passengers per train as 42. In many important respects the two reports are very nearly agreed.

	Gross earnings per revenue train mile.		Operating expenses per revenue train mile.	
	1888.	1889.	1888.	1889.
Poor	$1 38	$1.37	$0.95	$0.93
Commission	1.47	1 39	0.96	0.95

These are so close as to assure us of their substantial accuracy.

Prof. Adams gives an interesting table, showing earnings and expenses, passenger and freight mileage per mile of road for all the principal lines, the companies being arranged in the order of their gross incomes. The resemblances and also the contrasts between one road and another ought to furnish food for thought, as well as arguments for reasonably good rates upon traffic. The statistician also raises some questions bearing upon the politico-economic side of transportation; as whether the debt of our railroads should or should not be a permanent obligation. A word is said upon the matter of express companies who paid the railroads that year $19,736,411. Certainly the capital of the express and other companies is employed in transportation, and if complete returns are really necessary for the guiding of legislation, the capital of the Pullman and Wagner companies and the like should be included.

The table showing the styles of automatic couplers used is of comparatively little value now on account of its age. Passenger and freight cars are lumped together. The universality of the Miller for passenger cars, except on the Pennsylvania system, is well known. The inclusion of the Safford and other couplers, which are simply improved link-and-pin couplers, renders the total meaningless, even for the date given in the report.

The list showing the different gauges of track in this country is of course chiefly valuable as a curiosity, as the odd gauges are in use almost wholly on mining and logging roads, etc., where uniformity is not an important consideration. There were 39 different gauges in 1880, of which nine had dropped out in 1889. While the mileage of 3 ft. and 3½ ft. gauge railroads has increased from 5,498 in 1880 to 9,901 in 1889, it is not certain that such mileage is now increasing. We know from the action of such roads as the Toledo, St. Louis & Kansas City last year, and the Denver & Rio Grande and its connections this year, that all narrow gauge roads with important connections feel a constant and strong pressure to change to the standard gauge, and as regards such roads it is undoubtedly safe to say that the tendency to one standard is positive and irresistible. The mileage of 3 ft. or 3½ ft. gauge road on important lines has without doubt decreased within the past two or three years, but it is not impossible that short extensions of narrow gauge roads which are comparatively isolated may in the aggregate overbalance this, leaving the total mileage for the country larger each year.

It is interesting to note that 58 per cent. of the freight engines of the country are already equipped with a power brake. The engine and tender constitute a large per cent. of the total weight of each train, and especially of trains of empty cars, which are not an inconsiderable portion of the traffic. The use of these brakes shows clearly that the failure to make more rapid progress in the introduction of train brakes is not owing to a lack of faith in the principle of applying steam in the place of manual power for controlling speed.

While the totals given of bridges, trestles and tunnels will be of interest as landmarks, the statistics given on these points are not shown in sufficient detail to warrant instructive discussion. There are 3.36 miles of trestle per 100 miles of road, and .077 miles of tunnel in the same length; but the table showing the total number of bridges does not give their length or the number of spans.

The large amount of service given by the average American locomotive and car, as well as the average American employé is forcibly shown by the statistics printed. The average passenger engine running at 30 miles per hour continuously, would be in service 47 days and 7 hours in a year, and at the rate of speed assumed the mileage performed by each engine is just about equal to five round trips between New York and San Francisco by the New York Central, Lake Shore, Burlington, Union Pacific and Central Pacific.

The classification of railroads on the basis of miles operated, which was omitted last week from lack of space, is worth reprinting and is as follows:

Classification of road.	Operating corporations.	Aggregate mileage in classes.	Proportion to total mileage.
			Per cent.
Over 1,000 mileage	33	76,963	49
Mileage from 600 to 1,000	26	19,574	13
Mileage from 400 to 600	31	15,768	10
Mileage from 250 to 400	52	16,331	10
Less than 250 mileage	467	28,170	18
Total	609	156,805	100

The 33 companies included in the first class are named in the report. Twenty-one of them are west of Chicago.

The Census Statistics of Pig Iron Production.

The Superintendent of Census has issued his bulletin on the production of pig iron in the United States during the year ended June 30, 1890. In this bulletin the Superintendent says in part:

"The production of pig iron, including Bessemer, during the year named aggregated 9,579,779 tons (of 2,000 pounds to the ton), as compared with 3,781,021 tons produced during the census year of 1880, and 2,052,821 tons during the census year of 1870."

Translating these figures into gross tons of 2,240 lbs., the measure by which pig iron is sold, we have the following table:

PRODUCTION OF PIG IRON BY CENSUS YEARS, ENDING JUNE 30, IN GROSS TONS.

	Production.	Increase.	Increase per cent.
1870	1,832,876	.....	...
1880	3,375,911	1,543.035	84
1890	8,553,374	5,177,463	153

The increase for the 20 years has been at the rate of 366 per cent.

These figures of the Superintendent of the Census enable us to complete the table printed in the *Railroad Gazette* of July 18, based on the furnace capacities returned by the *American Manufacturer*, giving the production in gross tons for the first half of this year.

	By furnace capacities.	Actual production.
1888.		
1st half	3,170,019	3,020,092
2d "	3,375,859	3,469,646
1889.		
1st half	3,550,116	3,661,603
2d "	3,901,936	3,943,039
1890.		
1st half	4,641,605	4,610,335

Showing a difference of 31,270 tons, or less than $\frac{7}{10}$ per cent., a result on which both Mr. Weeks and Superintendent Porter may be congratulated. And the whole country is to be congratulated, not only on the vast production, which is 25.9 per cent. greater than for the corresponding half year preceding, but is 11.5 per cent. greater than our total make during the calendar year 1885. Virtually, all of these 4,500,000 tons have gone into consumption, notwithstanding the small mileage which has been added to our railroads during the first half of the year.

The increase in our annual make for the last decade has been divided among the states by groups as below:

Groups.	Amount of increase.	Percentage of increase.
New England states	2,521	8
Middle states	2,513,837	177
Southern states	1,277,209	408
Western states	1,363,408	154
Far Western states	20,488	717

It will be noticed that the increased production in the New England states is so small as to amount in effect to being stationary. It is about two per cent. less than in 1870. They will, however, probably continue for many decades to advance iron and steel to its most expensive shapes. Both the Southern and Western groups of states have made an advance in this yearly production about equal to our maximum production any year up to 1867, and the increase in the Middle states is greater than our total in any year but one up to 1879. Twenty-four states are now making pig iron.

The first seven states in the order of their production are Pennsylvania, Ohio, Alabama, Illinois, New York, Virginia and Tennessee. Alabama, which in the previous census ranked as 10th, taking the place then held by New York; Illinois displacing New Jersey, which is now 10th; New York taking the place previously held by Michigan, which is now eighth; and Tennessee, which was 13th 10 years ago, taking the place of Illinois. Some of the Southern and Western states show a very large percentage of increase, viz.: Alabama, 1,328; Virginia, 1,589; Illinois, 607; while Pennsylvania and Ohio have made gains of 144 and 137 per cent. Of the total production of the census year, 3,779,528 gross tons, or 44.1 per cent., was Bessemer pig, a commodity our friends on the other side thought we should run short of, and we made 133,892 tons of spiegeleisen, increasing our production by 1,066 per cent.

Comparing our production of the last three census years with the production of other countries during the calendar years ending on Dec. 31 preceding, we have in gross tons of 2,240 lbs. for the United States and the United Kingdom, and metric tons of 2,205 lbs. for Germany and France:

	United States.	United Kingdom.	Germany.	France.
1870	1,832,876	5,445,757	1,180,579	1,018,899
1880	3,375,911	6,009,434	2,226,587	1,344,757
1890	8,553,374	8,245,336	4,387,504	1,567,622

The Census Bureau allows itself the following prediction: "At the present rate of increase in production this country is destined soon to become the leading producer of pig iron in the world, possibly reaching this distinction in the calendar year 1890."

As the heaviest production in the United Kingdom was 8,493,287 gross tons in 1882, or over 60,000 tons less than ours for the census year, and as our production, as above shown was, comparing the census year here with the calendar year in great Britain, 606,880 tons, or 3.7 per cent. greater, it looks as if this prediction was made by one of Superintendent Porter's new mathematical machines, which has not yet got into working order. We have already more than done that, for there has been no appreciable increase in the British make of pig iron for the first half of thisyear.

That the railroad problem of Chicago is a gigantic and difficult one is familiar knowledge. The number of persons killed and injured at the grade crossings in that city each year is appalling, though it is probably not unparalleled. While it is recognized on all hands that a radical change must be undertaken some time, not every one realizes the importance of adopting a consistent and comprehensive plan in the immediate future. The action taken by the city government a few months ago, when the speed of trains was temporarily reduced on a number of important roads, was not based on any far-reaching plan, but was in many respects a temporizing scheme. It was proposed to elevate the railroads in some cases and in others to elevate the street. As viaducts for carrying streets above the railroads are being occasionally built (it is said that they are increasing at the rate of three or four per annum), it will in a short time become impossible to rearrange the railroads on any systematic plan. The gravity of the situation is not unappreciated, however, and we are glad to learn that the plan of extending the Calumet Belt Line, now under construction, completely around the city from lake shore to lake shore, and running a branch into the heart of the city on an elevated structure at some practical point, is being considered by a committee of the Western Society of Engineers, which has been appointed to obtain, collate, and analyze the facts connected with the general problem. This committee has some of the best railroad engineers upon it and is now at work. This scheme, outlined in our news columns last week, involves the construction of elevated freight yards, with hydraulic lifts, and would of course be very costly; but every year's delay only adds to the difficulties, and it is well that a serious attempt is to be made to properly define the problem and place it before the railroads and the city.

NEW PUBLICATIONS.

The *Independent* of this week prints a "symposium" on the railroad problem, filling a dozen pages of the paper. Of these four are taken up with an article on the history and statistics of the railroads of the United States by John P. Meany, editor of *Poor's Manual*. Mr. Meany takes a page for an outline of the early history of American railroads, and the balance consists of statistics familiar to our readers and to all who use *Poor's Manual*. A statement is given showing the names and mileage of about 100 of the principal new roads constructed in 1886, 1887 and 1888.

The principal feature of this publication is, however, a series of arguments on state control of railroads. Hon. Cassius M. Clay, or Kentucky, leads off with a fervid diatribe against wicked corporations in general. Edward Everett Hale discusses the principles of paternalism in government, and concludes that as railroads have become or will soon become necessary to all the people, state ownership and management will be forced upon us. Governments furnish water, education and other things, because all people need them. They refrain from making jack-knives and from smelting iron because no one pattern of jack-knife or kind of iron is needed by every citizen. His main points are: 1. The administration of our post-office is the wonder and despair of the rest of the world. 2. Our courts have successfully managed railroads through receivers. 3. Municipal works like the Boston Water Works are well managed. 4. State ownership gives all the immense advantages of publicity. 5. Jobs are inevitable everywhere. Other minor reasons are given.

Ex-Governor Larrabee, of Iowa, defends the action of his state. He rehearses the familiar arguments, and adds that under the discriminations resulting from favoritism important industries were crushed out in Iowa while a privileged few flourished. The present law is no worse than those of other states, and, in fact, has not bankrupted the roads. Business has revived, great reforms have been accomplished, but much remains to be done. Servile journalists are still subsidized, and at-

torneys are retained for political rather than professional services.

The next argument is by Prof. Richard T. Ely, of Johns Hopkins University. It is the principal paper of the series and is a strong argument for state ownership We regret that it reaches us too late for discussion this week; but the views of the *Railroad Gazette* are already well known. Prof. Ely says: The evil influence of corrupt capitalists is especially dangerous because it is underhanded and approaches unawares. State management would bring the conflicts into the light. Where one person has suffered from dishonest or inefficient government management of finances, 100 have suffered from dishonest or inefficient management of railroads. Improvements in the details, politeness of employés, etc., would surely follow, and small places would be accommodated more on a par with large cities, as was the case when the government of Great Britain took the telegraph lines in that country. No more parallel lines would be constructed. The inhumanity of railroad managers who adopt safety appliances to save money, but not to save the men's lives, is enlarged upon. Grade crossings in cities would be abolished. In Prussia the financial success of government ownership has surpassed anticipations. Public ownership would be the death of the spoils system in politics, for it could not live when its real significance became so plain. It has been the peculiar misfortune of political economy rarely to advocate any reform until it has been accomplished, but the number of political economists who favor government ownership is increasing.

An anonymous railroad manager presents some of the arguments against state control, but not at great length, nor with special force. He refers to the poor railroad facilities on the government roads of Europe, while one of the other writers speaks of the neat station buildings and other features of European roads with which ours contrast unfavorably. Mr. W. D. Dabney details some of the difficulties of state control in this country and under our present constitutional limitations.

The last two pages are taken up with 70 letters from railroad managers, inclosing their rules relating to the use of intoxicating liquors by employés. We need not tell our readers that these letters are all alike. The Missouri Pacific specifies beer as an intoxicating liquor, "because many people do not consider it to be such." The Central Vermont warns its men that any *appearance* of using liquor will be to their disadvantage. The New York, New Haven & Hartford, the Boston & Maine and others have no specific rule concerning intoxicants, and Vice-President Furber of the latter points out that good discipline keeps a force free from this evil without the necessity of a special rule.

TRADE CATALOGUES.

M. T. Davidson, manufacturer of improved steam pumps and hydraulic machinery, of 43-53 Keap street, Brooklyn, N. Y., has issued a new catalogue of 90 pages. It is well illustrated, and contains more information than is generally found in publications of this class. Much care has been bestowed upon it, and it evidences its maker's enterprise. A perusal of this book should prove of value to every manufacturer and steam user interested in the maintenance of an efficient, economical and durable steam power plant.

New England Roadmasters' Association.

ANNUAL MEETING AT BOSTON, AUG. 20.

In the discussion on the report of the Committee on Inspection and Premiums, which report was summarized in the *Railroad Gazette* of last week, the first thing was a paper by Mr. C. B. LENTELL (Boston & Albany) on track inspection. Mr. Lentell said, in part:

The first 11 miles of the Boston & Albany has four tracks, and the sections are two miles in length; the remainder of the main line is a double track road, and the sections are four miles in length. The foremen and their men start out to work at 7 a. m. and work 10 hours. A regular man on each section starts out afoot at the same time and walks the whole length of the section, taking with him a hammer and wrench. His instructions are to look sharp for broken rails, loose bolts, etc., and report to the foreman on returning any defect found. This is done every day in the year, Sunday included. You may ask why it is not just as necessary to go over the road at night or earlier in the morning. For this reason. My rails are mostly 72 lbs., and we have not had a broken rail for six or eight months. Trains are run continually all night and any imperfections would be discovered and reported, so unless I had an inspector to walk the track all the time (which I think I may be educated up to some time), and he had nothing else to do, I feel perfectly safe with inspection once a day. Once a day is not enough on all roads; where there are light rails, poor roadbed, and bad cuts and fills, the line should be patrolled oftener, and in the morning before the first train. In cases of heavy winds and rains men should be out all the time, both night and day; a system which I carry out on my division, on sections where there is any danger from heavy storms.

We have also a mechanical inspection. The spotter or low point marker* is an apparatus put on the truck of a car and run over the road a number of times a year. It can be set at any gauge, $\frac{1}{16}$, $\frac{1}{8}$ or $\frac{1}{4}$ of an inch. As the car is run over the road at 15 or 20 miles an hour, it will mark the sides of the rails with colored ink. If the machine is set to mark $\frac{1}{4}$ of an inch, it will mark all points that are $\frac{1}{4}$ in. too low; if set to mark $\frac{1}{8}$, it will mark points $\frac{1}{8}$ down, and so on. A section foreman will not be governed by this altogether while surfacing his track, but if he sees a blue spot he will know that there is a low place there. Even if the rail is up to the surface, the sleepers may be loose and work up and down in the ground, or the rail may be up from the sleepers, a defect which he could not see while sighting the track at a distance. Although at first I was one of the greatest enemies of mechanical inspection, I have now become one of its strong supporters.

About the last of September or the first of October of each year we start out on the annual inspection of the whole road. Our President is very much interested in this inspection, and is not slow to compliment the roadmasters on any efficient work, and what he does not see while he is on this inspection would not fill a very large book. Through him a system of prizes has been arranged for the division roadmasters and section foremen. There are four prizes to division roadmasters and five prizes to section foremen. One prize is for the best alignment and surface; one for the best joints and spikes; one for switches and frogs; one for ballast and sleepers, and one for ditches and cleanliness. The roadmaster and his assistants mark the condition of the road, but no one knows what the others mark. It is by the average of sections on the whole road that the prizes are awarded to roadmasters, but the section foremen only compete on their respective divisions. There is no chance for favoritism, as the marking of a division roadmaster does not count for anything on his own division. While I think I have a very superior lot of section foremen, the prize system gives them a strong additional incentive to do their work in the best possible manner. You see, it is possible for one section to take all the prizes.

Mr. E. W. HORNER (Central Vermont) thought that night track walkers were too apt to neglect their duties, and, while he believed in daily inspection, he thought it better to spend the same amount on permanent improvements which would insure the safety of the roadbed instead of paying men whose work was unsatisfactorily performed.

Mr. J. W. SHANKS (New London Northern) did not recommend night inspection except in stormy weather.

Mr. G. W. BISHOP (Fitchburg) said that his road was inspected twice every day—morning and night.

Mr. W. F. ELLIS then read a paper on frogs and switches, accompanied by drawings, and giving a form of specification for use in ordering frogs. Mr. Ellis said in part:

The greatest wear to a spring rail frog as now made is on the point or heel rail, side track side, where the outside edges of the tread of poor and good wheels strike it, owing to the other point or heel rail having cut farther into the tie. This wear can be helped by trackmen with adze and gauge. The guard rails, as well as the ties, under a spring rail frog should be well maintained to give its proper life. Another cause of failure of frogs is their imperfect line when first put in. Has not every one present had frogs of different makers or from repair shops that would not interchange with those in use of the same angle?

The report on ties was briefly discussed and the committee's report on Previous Discussions was read. The latter dealt with improvements in nut locks, rail saws, tie plates, and other devices which had been promoted by the exchange of views had at the meetings.

It was resolved that "to have a successful meeting it is essential to have all the appliances and devices that the supply firms can conveniently send, and we are very grateful to the firms who have sent devices this year and send to them a hearty welcome to our next annual meeting."

The Fitchburg Railroad Co. was thanked for an invitation, through its chief engineer, Mr. E. K. TURNER, to the roadmasters and their ladies for a trip to the Hoosac Tunnel and North Adams, on Friday.

On a request for experience with new devices Mr. J. S. LANE said that he had tried the 4½-in. Servis tie plate for two years. When the plates were removed no mark was found upon the tie, except that made by the flange of the plate; while with ties where the Servis plate was not used an indentation from $\frac{1}{4}$ to $\frac{1}{2}$ in. was found. It was voted that each member procure a certain number of Servis tie plates, put them into service and report the result at the next convention. The meeting was closed with prayer by Chaplin Horner and adjourned to the third Wednesday of August, 1891.

ADDITIONAL EXHIBITS.

S. C. Hill, Washington, D. C., distributed nickel-plated samples of the curved safety railroad spike.

Arthur L. Stanford, Evanston, Ill., showed the "New" Stanford track jack and the "New" Stanford track drill.

George R. Campbell, Bucyrus, O., showed photographs of Campbell's "improved perfect solid steel frog," Campbell's patented railroad crossing, spike hammers, and other track tools.

These firms were represented, but without exhibits: Manning, Maxwell & Moore, New York; Ramapo Iron Works, Ramapo, N. Y.; Jones Safety Nut Lock Co., Syracuse, N. Y.; the National Surface Guard Co., Chicago.

* Similar to Mr. Dudley's apparatus on his dynagraph car, well known to readers of the *Railroad Gazette*.

TECHNICAL.

Manufacturing and Business.

The Putnam Machine Co., of Fitchburg, Mass., is making extensive additions to its plant. A large building which was formerly leased to outside parties is being remodeled and improved, and will then be used for mill and repair work, the main shop being used entirely for machine tools. The firm is now building for the Wilson & Snyder Mfg. Co., of Pittsburgh, a large 80-ton iron planer—100 in. through the uprights. The tool was too large to be bored in the shop and an iron building was erected over it by the Berlin Iron Bridge Co. of East Berlin, Conn. Electric power is used, and the planer is being finished under this temporary structure. The company is also building one of its 48 in. iron planers for the Old Colony Railroad.

The Dickson Car Wheel Co., of Houston, Tex., is having put in place a cupola, which is expected to melt 14 tons of pig metal per hour, and which will be the largest cupola south of St. Louis. The company has been extending the works for some time, and will soon have a capacity of making 2,500 wheels per month. The capacity at present is 1,800 wheels. The remodeling of the foundry for making the Barr contracting chill car wheel is also about completed.

The Universal Radial Drill Co., of Cincinnati, recently received an order from the Swedish Government for one of its largest machines and one for the next smaller size for Monterey, Mexico, while three more of the latter size are to be shipped to various parts of the United States.

The Lappin Brake Shoe Co., of 45 Broadway, New York, states that the recent enlargement of its works has given its increased facilities and lessened the cost of manufacture of the brake shoes and the company therefore announces that the price for both flanged and plain shoes for cars or engines will be reduced to four cents per pound. Both flanged and plain car brake shoes, fitting the M. C. B. Standard Christie Head for wheels from 33 in. to 42 in. are kept in stock.

The Weimer Machine Works Co., of Lebanon, Pa., has an order from the De Bardeleben Coal & Iron Co., Bessemer, Ala., for six patent liquid cinder cars; from the Tennessee Coal & Iron Co. for eight cars. The company has also an order from the Detroit Iron Furnace Co. for one 30×72×48 in. poppet valve blowing engine. The enlarging of the machine shop and foundry, which will double the capacity, is about completed.

Detrick & Harvey Machine Co., of Baltimore, Md., has just completed an extension to its machine shop of 70 × 90 ft. Among other machine tools in course of construction is an "F" open-side extension planer, to plane 10 × 9 × 25 ft., weighing 90,000 lbs., for the Walker Mfg. Co., Cleveland, O., and a similar machine to plane 16 in. long for the Stearns Mfg. Co., Erie, Pa.; also three threading and slotting machines for guns of 8 in. to 12 in. calibre for the Watervliet Arsenal, West Troy, N. Y.

R. P. Jones, a prominent builder and railroad contractor of Knoxville, Tenn., has made an assignment. His liabilities are placed at $100,000 and assets at $80,000. About two years since he was badly hurt in a railroad wreck, and during his long confinement his business became entangled.

The National Railroad Forging Machine Co., with $200,000 capital stock, has been incorporated at Covington, Ky., to manufacture railroad forgings. The incorporators are J. S. Pessinger, of Brooklyn, N. Y., and H. M. Lewis, of Cincinnati.

Iron and Steel.

The track-bolt works of the Springfield Iron Co., Springfield, Ill., which were destroyed by fire on July 12, have been entirely rebuilt and a number of new facilities added, so that it is now one of the most complete track-bolt factories in the West. The new plant was placed in operation this week.

Thomas Carlin's Sons, of Allegheny, Pa., will erect a new plant at Herr station, which will consist of an iron building 100×120 ft., for a foundry, in which will be placed a 20-ton traveling crane; a three-story frame structure, 100×110 ft., will be used as a machine shop, and a boiler shop will be erected of iron and will be 50×110 ft. The present buildings in Allegheny will be used as warehouses. The foundry department at Herr station will probably be in operation late in September.

The Colebrookdale Iron Works, in Douglass township, Pa., are running on full time, and have several large orders for rolling mill work—one from the Ellis & Lessig Co., of Pottstown, Pa., and one from the Diamond State Iron Co., of Delaware.

Gordon, Strobel & Laureau, of Philadelphia, have contracted with the Leesport Iron Co., of Leesport, Pa., for a plant of two 18 × 60 fire brick stoves; with Eckert & Brother, Reading, Pa., for two 17 × 60; the Junction Iron Co., Mingo Junction, O., for four 20 × 70, and with the Lawrence Furnace Co., Lawrence Furnace, O., for two 14 × 60 stoves. The firm has now under construction 28 stoves.

The Robinson-Rea Mfg. Co. of Pittsburgh has received an order from the Roanoke Iron Co., of Roanoke, Va., for a complete plate mill, including boilers, piping and machinery. There will be a 36 in. × 48 in. engine, 26 in. three-high train, with tables and shear to cut ¾-in. plates.

The Vulcan Forge & Iron Works of the Lockport Iron & Steel Co., at Chartiers, Pittsburg, has been closed down for repairs. A new set of three-high muck rolls will be erected in the puddling department of 16 furnaces in place of the old ones. Four new puddling furnaces are being erected, and ten more will be built when these are lighted. By these improvements the daily capacity will be increased nearly 75 tons.

The Ellis & Lessig Steel & Iron Co., of Pottstown, Pa., has commenced the erection of a new building to enlarge its puddling department. Two more furnaces will be added to the mill, making 22 in all.

The Juniata Iron & Steel Works of Shoenberger & Co., at Pittsburgh, which have been idle two months, have resumed operation. The lifting tables on the large train of plate rolls have been enlarged by an additional length, and there has been erected a continuous roller table, about 100 ft. long, to move the plates from the rolls to the trimming shears. This improvement has effected a saving in labor of 10 men.

The Ironton Steel & Iron Co. has been organized in Minnesota. The capital is $1,000,000. The incorporators are: J. J. Sullivan, of Cincinnati; F. M. Williams, of Newport, Ky., and others. The company is organized to take charge of the Swift Harper steel plant now located at Newport, Ky., and transfer it to a site at Duluth, Minn., consisting of 20 acres, of which from 8 to 10 acres will be under roof. There will be 11 miles in all, besides the converter. It will require between 15,000 and 20,000 H. P. to run the plant. Each mill will be run by its own power. The plant will be finished and in running order by Aug. 1, 1891.

The Rail Market.

Steel Rails.—Eastern mills have closed a number of orders for small lots, and have other business of this character in sight. The Chicago and Pittsburgh mills have many inquiries but comparatively little actual business has been done. Quotations are: in the East, $30.50@$31; at Chicago, $33.50, for early delivery, and at Pittsburgh, $31.50@$32.50 at works.

Old Rails.—There have been no large sales in the

Eastern market. The quotations at Pittsburgh are: $27.50@$28, and old steel rails at $22@$23. At Chicago prices are about $26.75 for old iron rails, and $19@$22 for old steel rails.

The Pancoast Ventilator.

A test was made last week of the Pancoast car ventilation system at the West Philadelphia shops of the Pennsylvania. Freight car number 72,116 was fitted with the appliances and run out for 15 miles just back of a smoky engine on a muggy day without wind. Under these conditions the action of the ventilation depended upon the motion of the car. All openings but those through the ventilators were tightly closed. There was not a trace of smoke in the car at any time, the air being fresh and free from dust. There was a constant draught through the car vertically, at times sufficient to blow out a candle; and the exhaust overhead was strong enough to support a heavy felt hat. The results were so satisfactory that the car will remain several days at the West Philadelphia shops for exhibition. Mr. Pancoast proposes to license railroad companies to fit up their own cars with this ventilator. His address is 122 Dock street, Philadelphia.

The Tennessee Pass and St. Clair Tunnels.

The boring on the Tennessee pass of the Denver & Rio Grande road, north of Leadville, Colo., was finished last week. The tunnel is about 2,550 ft. long, and work was begun last December. The shields of the tunnel being built under the St. Clair River, between Sarnia, Ont., and Port Huron, Mich., were also joined last week.

A Dam across the Colorado River.

The city of Austin will receive bids until Oct. 15 for the construction of a dam across the Colorado River and the excavation of a hydraulic canal near Austin. The work involves 17,000 cu. yds. dimension stone masonry, 70,000 cu. yds. rubble masonry, 75,000 cu. yds. earth excavation and 55,000 cu. yds. rock excavation. Specifications and forms may be obtained from John McDonald, Mayor, or J. P. Frizell, Engineer.

Kelsey's Audible Signal.

The New York Central & Hudson River road, which has had six of Kelsey's audible signals in use for some time, in connection with the ordinary visual signals, in the tunnel near the Grand Central Station, New York, has now ordered all four of the tracks equipped with the device throughout the length of the tunnel, two miles. The Kelsey Railroad Signal Co. has set up an automatic station signal on the Williamsburg branch of the New York, New Haven & Hartford road, which is working very satisfactorily. It is a semaphore and is restored to the all-clear position by means of a wire operated by a track instrument one mile beyond the signal. The Kelsey automatic compensator is used. The Kelsey signal was illustrated and described in the *Railroad Gazette* of June 27 last.

THE SCRAP HEAP.

Notes.

During the recent dry weather the Atchison, Topeka & Santa Fe patrolled every mile of its track in Kansas day and night to avoid fires.—*Exchange.*

Representative Caldwell, of Ohio, from the Committee on Railroads and Canals, has reported to the House of Representatives the bill agreed on by that committee to compel railroad companies engaged in interstate commerce to equip their [freight] cars with automatic safety couplers and with automatic brakes. The limit of time for compliance is Jan. 1, 1893.

The Ohio railroad commissioner has issued the following circular to the railroads: Your attention is respectfully called to section 257, revised statutes of Ohio, requiring reports of accidents. This provision of the law is wholly disregarded in many instances, and where observed, the telegraph report, when made at all, is so meager in details as to be totally valueless to this department. It is certainly the intention of the law that full information regarding fatal accidents be furnished by wire to this department, and it is equally to the interest of the general public and the railroad companies that such information should be promptly given. This department will hereafter insist that all such reports shall not only be promptly made but shall be plain, explicit, comprehensive and sufficiently in detail to convey to the commissioner the correct data upon which he may base further action.

The Disaster at Reading.

On the forenoon of August 22, a car loaded with passengers on the Mount Penn gravity railroad, near Reading, Pa., descended a steep grade of 5 miles at furious speed, and was derailed and overturned at the foot of the mountain, killing 4 and injuring 14 persons. The conductor was among the killed. It appears that the road forms a loop and that the cars are pushed to the summit by a locomotive and then allowed to go down on the opposite side without an engine. Up to August 12 the cars had been controlled by hand brakes, but at that time a vacuum brake, operated by power taken from the axle of the car, was put on the cars and has since been used. The apparatus is similar to that used on the cars of the Brooklyn Bridge, which are propelled by cable. The coroner's jury that investigated the Reading disaster says: "The blame might reasonably be put on the brakeman and conductor, but they should not bear the responsibility in acting for the company, which employed as brakemen and car inspectors men who knew nothing about the brake lately adopted."

There was no clear testimony as to why the hand brakes failed to work (the men tried, seasonably, to use them), and some fault in the adjustment of the power brake to the foundation rigging seems to have been the cause of the disaster.

A New Stockyards Company.

The Interstate Stockyards Co. has filed articles of incorporation in New Jersey. The organization has a capital of $1,000,000. The incorporators are Nelson Morris, of Chicago, who owns all the shares but four; Abraham Rothschild and Edward Morris, of Chicago; Lewis H. Heyman, of New York, and Henry E. Alexander, of Brick Church, N. J.

A New African Railroad Opened.

A dispatch from Zanzibar states that the Mombasa & Nyanza Railroad was opened Aug. 25 in the presence of the British and other foreign consuls, Admiral Fremantle, of the British Navy, and a large number of other Europeans.

In Union is Strength.

It is an amiable thing to organize a railroad strike that helps to deprive city children of fresh milk in summer. However, as children are not "organized," they probably have no rights that the unions are bound to respect.—*Puck.*

LOCOMOTIVE BUILDING.

The Atchison, Topeka & Santa Fe is asking bids for 50 locomotives.

The New York, Chicago & St. Louis will soon let the contracts for building 25 ten-wheel engines.

The New York, Providence & Boston has let the contract for five mogul engines to the Manchester Locomotive Works.

The Cincinnati Southern has ordered two passenger engines, 13 freight and switching engines to the Pittsburgh Locomotive Works.

The Louisville, New Albany & Chicago is having five consolidation, four 8-wheel passenger and one 10-wheel passenger locomotive built at the Rogers Locomotive Works.

The Pittsburgh Locomotive Works are building four 19 × 26 in. 10-wheel engines for the Kansas City, Fort Scott & Memphis. These engines are to be fitted with the Dean guide.

The Wheeling Bridge & Terminal Co. has ordered two engines of the Rogers Locomotive Works.

The New York & New England has placed in service two of the 10 locomotives ordered of the Rhode Island Locomotive Works.

The Buffalo, Rochester & Pittsburgh has ordered six new 50-ton freight locomotives from the Baldwin Locomotive Works.

H. K. Porter & Co., of Pittsburgh, have four locomotives nearly ready for shipment to silver mines in Mexico. These engines have a tank on the boiler, and also over the rear truck. Two of the engines are 24-in. and two are 30-in. gauge of track.

The Pittsburgh Locomotive Works are building four freight engines for the West Virginia & Pittsburgh.

The Jacksonville, Tampa & Key West has received three locomotives from the Rhode Island Locomotive Works, said to be part of an order for 25.

The Rogers Locomotive Works are building five Jull snow excavators.

CAR BUILDING.

Schall & King, of Middletown, Pa., have been awarded the contract for building 300 cars for the Richmond & Danville in addition to the 200 reported Aug. 1. The Harrisburg Car Mfg. Co. has an order for 400 cars, and the South Baltimore Car Co. for 500 cars for the same road.

The Long Island road has placed an order for 100 cars with Murray, Dougal & Co., of Milton, Pa.

The New York Railway Supply Co., Ltd., has recently placed an order for 100 box cars for the Monterey & Mexican Gulf road with the Litchfield Car & Machine Works, of Litchfield, Ill.

The Canadian Pacific is said to have divided an order for 1,000 freight cars among three or four of the car companies in Canada.

The New York & New England has received from the Erie Car Works 200 of the 1,000 cars ordered some months ago.

The Kansas City Car & Wheel Co. has received an order from the Louisville, New Orleans & Texas for 500 freight cars, and from the Kansas City, Fort Scott & Memphis for 250 cars.

The order of the Kingston Car Co. from the Intercolonial is for 300 platform cars.

The Illinois Central has received the first instalment of 25 passenger cars ordered from the Pullman Car Works.

The West Virginia & Pittsburgh has under contract 500 box cars and 100 gondola cars.

The Winona & Southwestern has under contract 100 box and 50 platform cars. The first installment of 25 of the latter arrived last Monday at Winona, Minn. The company will shortly purchase two combination mail and smoking cars, two baggage and express cars, and six passenger cars.

The Burton Stock Car Co. is building at its shops at Wichita, Kan., 75 of its latest pattern cars, which are arranged for the transportation of either horses or cattle. The company has recently established a repair shop at Kansas City, and additions have been made to the one in Chicago. Sufficient machinery has been added to the plant to enable the company to rebuild cars at the latter place instead of sending them to Wichita.

The New York & New England is building six freight cabooses at the Norwood Central shops.

The Tennessee Midland last week placed a contract with the Indianapolis Car Works for 100 box cars.

BRIDGE BUILDING.

Augusta, Ga.—Bids are being received for the construction of a Howe truss bridge across the canal at Broad street, for which the City Council has appropriated $8,000.

Baltimore, Md.—One of the improvements suggested for Druid Hill Park is a bridge across the lake, which would be about 2,000 ft. long. The county bridge over the Baltimore & Ohio on the Golden Ray road, in the Twelfth district of Baltimore County, is reported to be so unsafe that a new one should replace it. The council committee on highways recommend an appropriation of $1,700 to complete the approaches of the Cedar avenue bridge.

Bedford City, Va.—B. F. Coxe, of Big Island, Va., will receive proposals until Sept. 5 for building a bridge over Reed Creek, near Big Island.

Bryan, Tex.—The town and the county commissioners of Brazos County are to build a new iron bridge across the Navasota River at a point near the Chaney crossing.

Clifton Forge, Va.—Proposals are wanted for the erection of a bridge over Smith Creek by the Clifton Forge Co.

Clinton, Ala.—The contract for the iron bridge at Clinton has been let to the Southern Bridge Co., of Birmingham, for $1,975. The span is 90 ft. long.

Crookston, Minn.—The new Northern Pacific railroad bridge across the Red Lake River has been completed. It is a Howe truss, 200 ft. long, with a 150-ft. span. It will not be used regularly until the track on the cut-off is ballasted, which will probably be done by Sept. 6.

Elizabeth, N. J.—The Board of Freeholders of Union Country have authorized the building of a new iron I-beam bridge with an 18-ft. span on Le Grand avenue and Richmond street over Cedar Brook in Plainfield, N. J. The cost will be about $2,500. They have also under consideration proposals for building bridges at Westfield avenue at a cost of $1,200 and over West Brook, in Roselle, N. J.

Galveston, Tex.—The city will rebuild the Sabine street bridge at an estimated cost of $5,783.

Hampton, Va.—The Board of Supervisors of Hampton County have appropriated $16,000 to build an iron bridge across the Hampton River. The bridge will have a wagon way 26 ft. wide, and it will be used by the Old Point & Hampton street railroad, which will pay part of the cost of the structure.

Keewatin, Ont.—The Provincial government is building an iron truss bridge at this point. The total expense, including cost of new road, will be $4,500.

Knoxville, Tenn.—An organization called the Cherokee Land Co. proposes to construct an iron bridge across the Tennessee River, near Knoxville, at a cost of about $100,000.

Loup City, Neb.—The county clerk of Sherman County will receive bids for two county bridges across the Middle Loup River, one 275 ft. long and 16 ft. wide, and the second 375 ft. long and 16 ft. wide.

Middlesborough, Ky.—It is proposed to construct a through girder iron bridge of about 70 ft. span and 100 ft. width across the canal on Cumberland avenue. B. L. Lloyd is City Engineer.

Montgomery, Ala.—The Board of Revenue has awarded the contract for the construction of a new iron bridge across Catoma Creek on the Selma road to the Vermont Construction Co., of St. Albans, Vt., for $4,500.

Northampton, Mass.—Bids will be received by the city of Northampton until Sept. 10 for a wrought-iron bridge, 56 ft. in length and 14 ft. clear width, with carrying capacity of 100 lbs. to the square foot. Each bid is to be accompanied by plans and specifications.

Paris, Ky.—The County Court is receiving bids for the construction of an iron bridge, the cost of which is not to exceed $5,000.

Pearsall, Tex.—The County Commissioners have awarded the contract for a bridge across the Leona River to the Berlin Iron Bridge Co.

Philadelphia.—The two west piers of the new Walnut street bridge are rapidly nearing completion. The pier at the shore line will be 70 ft. high and will have a solid concrete foundation, 45 ft. under water. The base of the west river pier is being laid of heavy blocks of granite.

Phillips, Me.—The Pittsburgh Bridge Co. has been awarded a contract for building a new iron and steel bridge across the Sandy River, near Phillips, for the Sandy River Railroad. The bridge will cost $4,000, and will be completed about Sept. 20.

Portsmouth, Va.—The contract for building the trestle through the marsh section of Portsmouth for the Seaboard Air Line has been awarded to Ross & Sanford, of Baltimore.

Pottstown, Pa.—Cofrode & Saylor will build 16 iron bridges for the Trenton Cut-off road. These structures will require about a thousand tons of bridge iron.

St. Augustine, Fla.—C. P. Carver, J. T. Brundage and Matthew Hays have incorporated the St. Augustine Bridge & Driving Park Co., whose plans include the construction of a bridge.

Sedan, Kan.—The Lantz Suspension Bridge Co. has been incorporated at Sedan, with a capital stock of $10,000, by George M. Lantz and others.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Boston & Albany, $2 per share, payable Sept. 30.
Delaware & Hudson Canal Co., quarterly, 1¾ per cent., payable Sept. 15.
Fort Wayne & Jackson, semi-annual, 2¾ per cent., payable Sept. 1.
Northern Pacific, quarterly, $1 per share, payable Oct. 15.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Albany & Susquehanna, annual, New York City, Sept. 17.
Baltimore & Ohio, annual, Baltimore, Md., Sept. 8.
Chicago, Milwaukee & St. Paul, annual, Milwaukee, Wis., Sept. 20.
Croton Valley, special, New York City, Sept. 2.
Dallas & Greenville, annual, Dallas, Tex., Sept. 6.
Dallas & Waco, annual, Dallas, Tex., Sept. 6.
Dallas & Wichita, annual, Dallas, Tex., Sept. 6.
Delaware & North River, special, 10 Wall street, New York City, Sept. 23, to act upon a proposed consolidation with the Port Jervis, Monticello & New York.
Gainesville & Henrietta, annual, Gainesville, Tex., Sept. 9.
Illinois Central, annual, Chicago, Ill., Oct. 8.
Iowa Central, annual, Chicago, Ill., Sept. 5.
Lake Erie & Western, annual, Bloomington, Ill., Oct. 1.
Minnesota & Northwestern, annual, St. Paul, Minn., Sept. 3.
Nashville, Chattanooga & St. Louis, annual, Nashville, Tenn., Sept. 10.
Norfolk & Virginia Beach, annual, Norfolk, Va., Sept. 4.
Nova Scotia Midland, annual, New Glasgow, N. S., Sept. 1.
Port Arthur, Duluth & Western, special, Port Arthur, Ont., Sept. 23.
St. Louis, Alton & Terre Haute, special, Laclede Building, St. Louis, Mo., Oct. 3, to consider the sale to the Cairo, Vincennes & Chicago.
St. Louis Merchants' Bridge Terminal, special, Laclede Building, St. Louis, Mo., Oct. 1, to vote upon a proposed increase of the capital stock.
South Atlantic & Ohio, annual, Bristol, Va., Sept. 10.
Toledo & Ohio Central, annual, Toledo, O., Sept. 1.
Wabash, annual, St. Louis, Mo., Sept. 9.

Railroad and Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Roadmasters' Association of America* will hold its eighth annual convention at Detroit, Mich., Sept. 9.

The *Claim Agents' Association* of the Eastern, Middle and Southern States will be held at Chicago, Sept. 11.

The *American Association of General Passenger & Ticket Agents* will hold its thirty-fifth semi-annual meeting at Denver, Col., Sept. 16.

The *American Society of Railroad Superintendents* will hold its annual meeting in New York City, Oct. 7.

The *General Time Convention* will hold its next semi-annual meeting at the Hotel Brunswick in New York City, Oct. 8.

The *New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m. The Club has adjourned until Tuesday, Sept. 16.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *Northwest Railroad Club* meets on the first Saturday of each month in the St. Paul Union Station at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Saturday following the second Wednesday of each month at 7:30 p. m. in the directors' room of the St. Paul Union station, except in the months of July and August.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month. at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at the American House, Boston, at 7:30 p. m. on the third Wednesday in each month. The next meeting will be held the third Wednesday in September.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m , on the first Tuesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the House of the Club, 1,122 Girard street, Philadelphia.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Penn Building, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month at the Club rooms, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8:00 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the Southwest* holds regular meetings on the second Thursday evening of each month at 8 o'clock, at the Association headquarters, Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7.30 p. m., on the third Saturday in each month.

The Civil Engineers' Association of Kansas holds regular meetings on the first Wednesday in each month at Wichita, Kan.

American Institute of Mining Engineers.

The Secretary of the Institute has issued a circular describing the arrangements proposed for the meetings of the Institute and of the British Iron and Steel Institute.

The meeting of the Institute will be held, as already announced, in New York City, beginning Sept. 29, 1890, at 2 o'clock. All sessions will be held in Chickering Hall, 130 Fifth avenue. Hotel headquarters will be at the Park Avenue Hotel, 482 Fourth avenue, where the Institute will also maintain during the month of October a post-office and bureau of information for members and guests. Special rates at the Park Avenue Hotel, $3.50 per day. Applications for rooms and all other communications concerning the New York meeting (except such as relate to papers) should be addressed to James F. Lewis, Chairman of the New York Local Committee, 23 Park place, New York.

The following programme is provisionally announced:

Sessions of the Institute for the reading and discussion of papers on Monday afternoon and evening and Thursday morning, afternoon and evening. On Wednesday, Thursday and Friday mornings the sessions of the British Iron and Steel Institute will take place.

On Wednesday afternoon there will be an excursion of the two societies and invited guests upon the Hudson River. (Lunch on board the steamer.)

On Thursday afternoon the Holley Memorial will be unveiled in Washington square. The commemorative address will be delivered in Chickering Hall, previous to the open-air ceremony, by Mr. James Dredge, Editor of *Engineering*, London.

On Saturday, members and guests will proceed by special train to Philadelphia; on Tuesday, Oct. 7, to Lebanon and Harrisburg, and on Wednesday to Johnstown and Altoona, arriving Wednesday evening at Pittsburgh, according to the programme of the general reception committee.

At Pittsburgh two joint international sessions will be held by the two societies and their guests for the reading of papers. Further announcement will be made hereafter concerning these sessions, and special programmes will be issued by the local committees of Philadelphia, Pittsburgh, and the principal points to be visited in the subsequent general excursions.

The general excursion will proceed from Pittsburgh to Chicago, and at the close of the visit to Chicago will divide into two parties, going respectively north and south. According to the programme of the General Reception Committee, the northern excursion will visit the Menominee, Gogebic and Marquette iron ranges and the Lake Superior copper district, returning to New York *via* the Sault Ste. Marie Canal, the Sudbury (Canada) nickel and copper mines and Niagara, while the southern excursion will go from Chicago to Birmingham, Shelby and Anniston, Ala., returning to New York *via* Chattanooga, Tenn., Middlesborough, Roanoke, Cripple Creek iron mines and Pocahontas coal mines, Luray, Va., and Washington. Both excursions will reach New York about Oct. 28. All communications concerning the excursions should be addressed to Mr. Charles Kirchhoff, Jr., Secretary of that committee. Railroad transportation and sleeping-car accommodations will be furnished by the General Committee to the members of the Iron and Steel Institute and other invited guests from abroad. Members of this Institute (and others, in the discretion of the General Committee), to the extent of practicable accommodation, may obtain tickets entitling them to participate in the excursions and entertainments *en route* at the following rates, which cover railroad fares and Pullman berths only, viz.: New York to Pittsburgh and return, $20; New York to Pittsburgh and Chicago and return, $30; New York to Pittsburgh, Chicago, and over the Northern or the Southern excursion route and return to New York, $60; Philadelphia or Pittsburgh over either route and return to starting point, $60.

Application made on the blank provided and accompanied with check for the amount of fare, must be sent to Mr. Charles Kirchhoff, Jr., 66 Duane street, New York City, before Sept. 10.

PERSONAL.

—Mr. F. W. Dean, mechanical engineer, is making an extended series of tests of locomotives for the Union Pacific, and leaves for Cheyenne this week to place the same in the hands of a competent assistant.

—Col. Matthew Quigg, General Fuel Agent of the Atchison, Topeka & Santa Fe, died at his home in Atchison, Kan., Aug. 20. He was 53 years old, and had been in the employ of the Atchison road since 1879.

—Mr. Thomas Saunders, who has been Superintendent of the Colorado Midland, has resigned that position and accepted a similar one on the Rio Grande Junction, which is being built jointly by the Colorado Midland and the Denver & Rio Grande.

—Mr. F. S. Mertsheimer, Master Mechanic of the Kansas Division of the Union Pacific, has been appointed to succeed Mr. R. W. Baxter as Superintendent of the Wyoming Division. Mr. Mertsheimer has been previously Master Mechanic of this division, and has been connected with the Union Pacific for about 20 years.

—Mr. Thomas L. Chapman, Superintendent of Motive Power of the Central of Georgia, has resigned that position and it is reported has been succeeded by Mr. A. W. Gibbs, Master Mechanic of the Richmond & Danville, at Alexandria, Va. Mr. Chapman was appointed to this position on the Central of Georgia in May, 1889. He had previously been Manager of the Safety Car Heating & Lighting Co. and also Superintendent of Motive Power of the Chesapeake & Ohio.

ELECTIONS AND APPOINTMENTS.

Brigantine Beach.—The officers of this road at present are: Robert B. Rooseveit, President; Garrett Van Nostrand, Vice-President; James B. Van Woert, Treasurer and General Manager, and Edward C. Stoutt, Chief Engineer.

Central of Georgia.—S. Hill, formerly Chief Train Dispatcher, has been appointed Assistant Master of Trains, with headquarters at Savannah, Ga.

Cheraw & Chester.—The annual meeting of the stockholders of the company was held in Chester, S. C., recently. W. H. Hardin was re-elected President and D. Hemphill, Secretary and Treasurer. The following are the new Directors: J. L. Glenn, O. Barber, J. W. McDaniel, J. W. Wilks, W. H. Hardin, B. J. Witherspoon, J. W. Twitty, J. N. Crockett, J. N. Williams and J. H. Harper.

Chicago, Rock Island & Pacific.—F. W. Madera has been appointed Northwestern Passenger Agent of the road.

Columbus, Geneva & Western.—The following Board of Directors has been elected by this Alabama company: John T. Davis, W. C. Koonse, J. I. Darby, H. M. Beach, George L. Campbell and A. A. Jones, of Columbia; R. A. Foster, of Cowarts; Geo. H. Malone, J. J. Johnson, J. D. Holloway and E. J. Bariand, of Geneva.

Coos Bay, Roseburg & Eastern.—T. R. Sheridan has been elected President; F. W. Burnett, Vice President and General Solicitor; W. E. Baines, Secretary and Treasurer, and R. A. Graham, General Manager. The board of directors includes the foregoing officers and W. B. King, E. G. Flanagan and O. J. Seeley. The principal office is at Roseburg, Or.

Davenport, Middleburg & Durham.—The following directors have been chosen: Judge Harris, of Coopertown, N. Y.; W. E. Thorne, J. Edward Young, John H. Cornell, Jerome B. Badgley and Jacob Neville, of Middleburg, N. Y.; Benjamin H. Avery, of Jefferson; Charles W. Vroman, of Fulton; N. C. Whitcomb, of Oak Hill; Elias W. Dutton, of Livingstonville, N. Y.; Melvin C. Wright, of Blenheim; John Avery, of Catskill, and Henry Russell, of Albany, N. Y.

Eastern Minnesota.—C. K. Lawrence, formerly General Superintendent, has resigned, and the office has been abolished. F. A. Merrill, formerly Division Superintendent of the Wisconsin Central, has been appointed to the position, with the title of Superintendent.

Farmville & Powhatan.—W. C. Laughton has been appointed General Freight and Passenger Agent of this company, with headquarters at Richmond, Va., vice P. M. Buckingham, resigned to accept service elsewhere.

Frankfort, Pacific & Eastern.—J. A. Steele, of Helena, Mont.; Capt. J. H. D. Gray and J. C. Bell, of Astoria, Or.; C. S. Togg, of Tacoma, Wash.; L. T. Chenault, Jr.; S. P. Mulligan and Harry H. Jones, of Frankfort, and J. T. Gray, of Portland, are the incorporators of this road.

Georgia, Carolina & Northern.—C. Y. Cheatham, formerly of the Norfolk & Carolina, has been appointed Master of Trains of this division of the Seaboard & Roanoke line.

Gouverneur & Adirondack.—F. H. Leonard, Jr., J. L. Hinds, A. W. Kilby, E. C. Cooke, F. B. Roblin, J. A. Fox, Syracuse, N. Y., and Frank Watts, Watertown, N. Y., are the directors of this new company.

Lebanon, Mascoutah & Fayetteville.—The directors of this recently organized company have elected the following officers: President, Louis Zerwick, of Lebanon, Ill.; Secretary, Peter W. Lill, of Mascoutah, Ill., and Treasurer, James D. Baker, of Lebanon.

Louisville, New Albany & Chicago.—L. W. Schafer has been appointed Master Mechanic of the Second Division, with headquarters at Lafayette, Ind., to succeed Joseph Coburn, resigned.

Marblehead & Danbury.—The incorporators are S. Sloss, J. E. Ingersoll, Albert Straus, J. E. Casement and A. F. Ingersoll, of Marblehead, O.

Missoula & Northern.—John M. Keith, Charles H. McLeod, Thomas C. Marshall, Richard A. Eddy and Thomas L. Greenough, of Missoula, Mont., and E. L. Bonner, of Deer Lodge, Mont., are the incorporators of this Montana company.

New York & Long Branch.—James N. Du Barry and Henry D. Welsh, of Philadelphia; William T. Chambridge, of Burlington County, N. Y.; William J. Sewell, William N. Bunnard and Aaron L. Dayton, of Camden, N. J., and Martin P. Gray, of Salem, N. J., are the incorporators of this road.

Northern Pacific.—C. J. Wilson has been appointed Assistant Superintendent of the St. Paul division of the road, vice A. E. Law, promoted to be Superintendent.

Ohatchie Valley.—The following are the officers of this new Alabama road: J. C. Laney, President, Laney, Ala.; J. E. Line, Treasurer, Chattanooga, Tenn.; F. E. Jackson, Secretary, Attalla, Ala., and P. S. Fitzgerald, Chief Engineer, Gadsden, Ala.

Peace River & Boca Grande.—M. F. Knudson, M. T. Singleton, J. L. Sandlin and Grove Cochran are directors of this Florida Company. The principal office is at Punta Gorda, Fla.

Pittsburgh, Cincinnati, Chicago & St. Louis.—George B. Roberts, J. N. Du Barry, John P. Green, Frank Thomson and W. A. Patton, of Philadelphia; J. N. McCullough, Thomas Messler and James McCrea, of Pittsburgh, and William L. Scott, of Erie, Pa., are given as the directors in the charter filed in Illinois last week.

Rio Grande Junction.—Thomas Saunders has been appointed Superintendent of the road, with headquarters at New Castle, Col.

Rio Grande Western.—John J. Landis has been appointed Freight Contracting Agent for this company, with headquarters at Salt Lake City, vice J. D. McGill, resigned. Mr. Landis has been Contracting Freight Agent of the New York, Chicago & St. Louis at Indianapolis since 1887.

St. Louis, Merchants' Bridge & Terminal.—The annual meeting of this company was held in St. Louis last week. The following were elected directors: C. C. Rainwater, C. D. McClure, J. Whittaker, J. H. Overall, J. D. Perry, L. M. Rumsey, C. C. Maffitt, Paul A. Fusz, Seth W. Cobb, Wm. H. Thompson and D. R. Francis.

Sioux City & Northwestern.—The stockholders met in Sioux City, Ia., recently, and officers were elected as follows: President, D. P. Gere; Vice-President, J. F. Duncombe; Treasurer, A. S. Garritson; Secretary, F. M. Frazer; Chief Engineer, L. F. Wakefield; Attorney and Counsel, J. F. Duncombe.

Union Pacific.—F. Mertshimer has been appointed Superintendent of the Wyoming Division, with office at Cheyenne, Wy., vice R. W. Baxter, resigned.

White River.—The trustees are: Elijah M. Goss, Andrew S. Opdahl, Charles W. Joyut and George A. Mitchell. The road has been organized in Washington. The principal office is at Buckley.

Wisconsin, Bee Line & West Superior.—The following are incorporators of this company, in addition to those given last week: C. F. Hall, M. Fox, J. R. Bloom, R. O. Bigford, A. G. Purdy, C. Chandler, H. W. Newton, G. L. Smith, W. E. Cole and M. G. Smith.

Wisconsin Central.—Joseph Kavanaugh has been appointed General Freight Agent and Louis Eckstein General Passenger and Ticket Agent of this line.

RAILROAD CONSTRUCTION.

Incorporations, Surveys, Etc.

Atlantic Avenue Elevated.—The Commission appointed by the Supreme Court to examine the question of an elevated or depressed road on Atlantic avenue, in Brooklyn, N. Y., for the tracks of the Long Island road, has reported in favor of the former plan, which was proposed by the Rapid Transit Commission. The avenue is 6½ miles long from the East River ferry to the city line. The whole width is 100 ft. Between Flatbush avenue and the city line 28 ft. in the centre of the avenue is occupied by a double track surface road used by the Long Island Co. This steam surface road, east of Flatbush avenue, cannot be removed except by the consent of the company. It is fenced in along its whole length, with gates at the street crossings, and has practically destroyed the usefulness of Atlantic avenue. The elevated structure proposed will be like the structure recently built by the Union Elevated Railroad in Flatbush avenue, with iron pillars not exceeding 22 in. in diameter, placed outside the surface railroad tracks, having a span east of Flatbush ave. of 27 ft., and west of Flatbush ave. of 24 ft. The structure proposed will not be of sufficient size to carry the heavy engines of the Long Island road, but engines not exceeding 35 tons in weight will be attached to the ordinary cars of the line at Jamaica, and by them drawn over the elevated road to South Ferry. To accommodate rapid transit trains numerous stations will be established, and for the Long Island trains a third track will be built east of Flatbush avenue. The South Ferry station will be used only for terminal purposes.

Baltimore & Drum Point.—The contract for grading the road from Friendship to the terminus at Drum Point, Md., about 50 miles, has been awarded to Rogers & Clement, 45 Broadway, New York. The road is ready for the rails through Anne Arundel and Calvert counties, excepting at points where the right of way has been refused by owners of the land. An officer says there will be no delay in completing the road from Millersville to Drum Point.

Baltimore & Eastern Shore.—The road has been opened for regular passenger and freight business from Claiborne, on Eastern Bay, southeast to Vienna, Md., on the Nanticoke River, a distance of 30 miles. Trains have been running over this section for some weeks. There is a steamer transfer across Chesapeake Bay from Claiborne to Bay Ridge on the western shore of the bay, and the terminus of the Annapolis & Baltimore Short Line. The distance of the ferry is 12 miles.

Belleville & St. Louis.—A new survey is being made for this road, which is projected by Edward L. Thomas, of Belleville, Ill., to build a short steam railroad between Belleville and East St. Louis for freight and passenger traffic.

Birmingham, Sheffield & Tennessee River.—The company has a large force of men at work at a point about five miles from Riverton on the Tennessee River, making a rock cut through a large hill. This work will be completed in about a month. The other heavy work on the extension between Riverton and Margerum, Ala., a distance of 11 miles, is also about completed, and tracklaying will begin very soon

Brigantine Beach.—This road will be opened for traffic this week, and will be operated by the Philadelphia & Reading in connection with the Atlantic City road. The line extends from Brigantine to Brigantine Junction or Pomona, N. J.; a distance of about 13 miles, and will open up a valuable beach directly north of Atlantic City.

Camden & Alexandria.—John Buckley, of Camden, Ark., has been awarded the contract for clearing and grubbing on this line between Camden and El Dorado, Ark., a distance of 32 miles. York, Woods & Loonan, of Wichita, Kan., have been awarded a contract for grading on the same section. The contracts for the bridges and ties will be let in a few days. It is expected to have the line completed to El Dorado within six months. The locating survey has been completed to that point, but beyond this only a preliminary line has been run. The maximum grade on the section just put under contract is one per cent. compensated. The maximum curvature is three degrees. The approximate estimate of earth work excavation is 20,000 cu. yds. per mile.

Canadian Pacific.—The tracklaying on the extension of the Southwestern branch from Glenboro west, a distance of about 45 miles, to Plum Creek, Man., has been finished from the former point to near the connection with the Northern Pacific & Manitoba, near Brandon. Some track has also been laid from Plum Creek eastward, and it is expected that by the time it reaches the Northern Pacific & Manitoba crossing the company will have obtained permission from the Privy Council of the Dominion to make the crossing. Egan Bros. and J. C. Dennison are the contractors.

Charleston, Cincinnati & Chicago.—The tracklaying on the contract of W. Kenefick, of Kansas City, was completed Aug. 20. This section extends from Johnson City, Tenn., south through Unicoi County to the state line between Tennessee and North Carolina, a distance of about 20 miles. Every means was adopted to hasten the work between these points to complete it by Aug. 20, in accordance with the agreement made with Unico County, by which the company was to receive $50,000 of the county bonds.

Tracklaying is in progress on the section north of Johnson City to Minneapolis, Va., 90 miles.

Charleston, Sumter & Northern.—The company has commenced the operation of Pond Bluff branch from Eutawville to Ferguson, S. C., six miles. The stations are Belvidere, three miles, and Ferguson, six miles from Eutawville.

Chicago, Milwaukee & St. Paul.—Work has been commenced at Caledonia Junction, Minn., on the narrow gauge line from Preston to the Mississippi River, widening the grade, preparatory to changing the road to standard gauge early in the spring. The road will also be extended to a connection with the Southern Minnesota division at Spring Valley.

Chicago, Rock Island & Pacific.—A large part of the grading on the extension from Omaha to Lincoln, Neb., has been completed in Douglas and Sarpy counties, between South Omaha and the Platte River. The contractors have about 1,000 men and 700 teams on the work. The right of way has not yet been secured through Lincoln, and the company is having much difficulty in this part of its work. The location has been finished to Havelock, a suburb of Lincoln, but between that point and the city the line has not been decided upon. The tracks of the Burlington & Missouri River road will be crossed near this point to give the new line a connection with the Union Pacific for Beatrice.

Coos Bay, Roseburg & Eastern.—The survey of this road has been made from Coos City, near the Pacific coast, easterly to Myrtle Point, a distance of about 30 miles. The road is projected through southern Oregon, from Coos City to Roseburg, Or., on the Southern Pacific, a distance of about 50 miles. The contract for the grading has been let to R. A. Graham, whose headquarters will probably be at Rosedale.

Coudersport & Port Allegany.—W. S. Grattan & Co., of Buffalo, N. Y., who had the contract for building the first five miles from Coudersport to Sweden Valley, Pa., of the extension to Galeton, have completed that work and the branch will probably soon be placed in operation.

Davenport, Middleburg & Durham.—A company is being organized in New York under this name by residents of Davenport, Cooperstown, Middleburg, Durham and Catskill to build the proposed road from East Durham northerly through Middleburg and westerly to East Davenport, which will complete a new line between the Catskill Mountains and Cooperstown. A preliminary survey has been made, and a large part of the right of way secured. The capital stock is $600,000.

Decatur, Chesapeake & New Orleans.—Tracklaying on this road is now in progress from three points from Shelbyville, Tenn., south; from the Tennessee and Alabama state line, south, toward Decatur, Ala., and north from the latter town. On this 45 miles about 1,000 men and 500 teams are reported at work. The road is in operation through Lincoln County, Tenn., between Fayetteville and Shelbyville, a distance of 34 miles. The road is being built by the Decatur & Nashville Improvement Co., of which A. Ames Howlett, of 115 Broadway, New York City, is President, and W. H. Calhoun, of Fayetteville, Chief Engineer.

Deer Creek & Susquehanna.—It is reported that construction work is to be resumed in September between Belair, Md., on the Maryland Central, and Stafford, on the Susquehanna River, about 16 miles northwest. Some grading was done on the line about a year ago, but the work was suspended last October and since then nothing has been done. The line will be operated by the Maryland Central when it has been completed.

Denver & Rio Grande.—The grading on the San Luis branch from Villa Grove to Alamosa, Colo., a distance of 54 miles, will not be completed until about Oct. 15. The rails are being rapidly laid as stated last week. The names of the stations will be Villa Grove, Hot Springs, Mirage, Moffat, La Garita, Dune, Garrison, Patterson and Alamosa.

Engineers of the company are making a survey for a short branch in Douglas County, Col., from Castle Rock, a point about 40 miles south of Denver, east about 5½ miles to some new quarries.

East Georgia.—F. T. Lockhart, J. L. Fleming and J. T. Newberry have chartered this company in Georgia to construct a road from near Grovetown to Appling, a distance of 10 miles. The capital stock is $100,000.

Easton & Northern.—This road was recently completed between Easton, near the junction of the Lehigh and Delaware rivers, northwesterly to Ashland, near Nazareth, Pa., the southern terminus of the Bangor & Portland, by which the road will be operated. Passenger trains began running Aug. 23. The road is about 10 miles long.

Emmitsburg.—The survey for the proposed road from Emmitsburg, Md., the northern terminus of this line, north to Gettysburg, Pa., was completed Aug. 22. The extension will be about 11 miles long and the work will be light for most of the distance. The survey was made by Beaton Smith, of York, Pa., and was commenced about two weeks ago, as stated in these columns at the time.

Fairhaven & Southern.—McCoy & O'Brien have been awarded the contract for the tracklaying on this road between Fairhaven, Wash., and a connection near the international boundary line with the New Westminster Southern, which is the corporate name of the extension to New Westminster, B. C. The tracklaying was begun last week, and it is stated that it will be finished to the boundary line by Oct. 15.

Findlay, Fort Wayne & Western.—The rails for the extension from Ottawa, O., west to Fort Wayne, Ind., 57 miles, are being delivered along the line, and work will soon be commenced on the section to a connection with the Toledo, St. Louis & Kansas City, at Evansville. Most of the grading between Ottawa and Fort Wayne was built by the former company, the American Midland. The contract for repairing it and for tracklaying has been awarded to C. G. Patterson, of Boston. There are three important suspension bridges on the first 40 miles of the extension, two being across the Blanchard River. They vary in length from 242 to 380 ft. The contracts for these structures will be let this week. They will cost when completed between $85,000 and $87,000. The maximum grade west of Ottawa is 16 ft. per mile. Of the 80 miles of the road, 46 miles is on one tangent. The mortgage is at the rate of $18,000 per mile, $1,000 being used for equipment.

Florida Midland & Georgia.—Bids have been received for building the road between the Florida state line and Deadman's Bay, on the west coast of Florida, 80 miles, and the contract will probably be awarded shortly. The road has been located from Valdosta, Ga., to the state line, and three preliminary surveys have been made from this point to tidewater on the Gulf of Mexico. The 10 miles in Georgia were graded by a former company some years ago, and about 100 men are now repairing this work. The maximum grade on the road is 42 ft. per mile, and the maximum curves are six degrees. Arthur Pew, of Talbotton, Ga., is Chief Engineer.

Fort Worth & Rio Grande.—The grading on the extension from Dublin southwest to Comanche, Tex., a distance of about 22 miles, was completed to the latter point last week. Tracklaying will soon begin. The road is to be extended beyond Comanche, and a number of preliminary surveys have been made to various points southwest of that town, but the company has not yet decided what line to adopt.

Frankfort, Pacific & Eastern—This company has been organized at Astoria, Or., and the charter has been filed in Oregon, to build a road from Frankfort, Wash., westerly to the Pacific Ocean, in Pacific County; another line northwesterly from Frankfort to Spokane Falls, Wash.; also a line from Frankfort, or some point on the main line, northerly to Port Townsend, Wash. The capital stock is $150,000. The principal office is at Astoria.

Genesis & Abed River.—Ground was broken on this road at Crossville, Tenn., Aug. 23, and the occasion was made the basis for local celebration. The road is to be about 60 miles long, and will extend through Cumberland County, Tenn.

Georgia, Carolina & Northern.—The tracklaying was finished last week to Clinton, S. C., about 90 miles southwest of Monroe, N. C., the northern terminus. All the trestles between Whitmires and Clinton have been finished and train service will probably be extended from Whitmires to the latter point by Sept. 1. The track has also been laid from Greenwood northerly towards Clinton for a distance of about 15 miles to a point near the Saluda River. The iron bridge across that river and across the other streams north of the Savannah River are being erected. The grading has been finished as far as the Savannah and the track will probably reach Abbeville next month. The distance from that point to the Savannah River is 25 miles. Altogether about 1,000 men are at work on the line in South Carolina and Georgia.

Georgia Southern & Florida.—It is proposed to begin work this or next week on the extension of this road from Tipton southwesterly to Thomasville, Ga., 80 miles. The contractors are to complete the road in eight months. The work was awarded to Morgan & Reynolds several months ago.

Georgetown & Silver Creek.—Work has been commenced on this road which is to extend from a connection with the Colorado Central in Georgtown along the base of the Saxon and Columbian Mountains to Silver Creek and Camp Lamartine, the present proposed terminus. The grade will not exceed 4 ft. per mile between Georgetown and Silver Creek, but from that point to the Lamartine the grade will be somewhat heavier. The road will probably be extended to Chicago Lakes. The principal traffic will be in coal and mineral ores and mining camp supplies. G. W. Hall is President.

Gold Belt & Western.—Articles of incorporation have been filed in Idaho by this company to build a road from Hailey, on the Northern Pacific, west a distance of about 80 miles, to Junction Bar, on Boise River, and north of Boise City. The capital stock is $1,200,000.

Gouverneur & Adirondack.—This company has been incorporated in New York for the purpose of constructing a road from a point near Gouverneur, on the Rome, Watertown & Ogdensburgh, and thence up the valley of the Oswegatchie River, via the village of Hailesboro, to a point near Edwards. The length of the road is 13½ miles, and entirely within St. Lawrence County. The capital stock is to be $150,000.

Great Falls & Canada.—The tracklaying on this road which is being built from Great Falls, Can., northerly to Lethbridge, Alberta, was completed to the international boundary line at a point to be known as Sweet Grass Station on Aug. 16. The distance is about 133 miles, and this part of the road will probably be ready for operation about Sept. 15.

Gulf, Colorado & Santa Fe.—Ricker, Lee & Co., of Galveston, Tex., have commenced work with a large force on their contract on this road, which embraces the widening of cuts and raising embankments and preparing the line through Texas for ballasting.

Houston, Central Arkansas & Northern.—The locating survey for the extension from Columbia and Riverside south to Alexandria, La., 55 miles, was completed last week by C. C. Campbell, locating engineer. Henry, Forrest & Co., of St. Louis, who have the contract for this extension, have 800 men and 250 teams employed. The clearing has been finished to the Little River, about 20 miles from north of Alexandria, and the grading has been completed from Riverside south to the Ouichita River.

Houston & Texas Central.—A small force is ballasting the branch from Hutchins westerly to Lancaster, Tex., on the Missouri, Kansas & Texas, a distance of five miles. Regular trains commenced running between the two points last week.

Kansas City, Watkins & Gulf.—The grading will probably be completed this week from Lake Charles north to Spring Creek, a point about 20 miles south of Alexandria, La. About 200 men and 100 teams are employed on the work. It is believed that much greater progress will be made within the next few months than in the early part of the year, as the frequent heavy rains delayed the work very much at that time. The contract for grading between Spring Creek and Alexandria will be awarded in a few days. A reconnoissance has been made north of the Red River toward the Arkansas state line, and the survey will be commenced as soon as this has been finished.

Kearney & Sheridan.—J. J. Martin, of Pine Bluff, Ark., is making a survey for this road between Kearney, a point about 18 miles north of Pine Bluff, Ark., southwesterly to Sheridan, Grant County, a distance of about 15 miles.

Louisville & Nashville.—Joseph Coyne, of Louisville, Ky., has received a contract for the Napier branch which is to be built from Summertown, Tenn., to property of the Napier Iron & Manufacturing Co. It will be 11 miles long.

Tracklaying is in progress on the line from Cumberland Gap easterly to a connection with the Norfolk & Western at Norton, Va. It is expected to open the line for traffic in February, and possibly earlier. The tracklaying was begun July 15.

Louisville, New Orleans & Texas.—The Tallahatchie branch of the company has just been completed. It extends from Clarksdale to Minter City, 40 miles, and traverses a rich cotton-growing country.

Macon & Atlantic.—A preliminary survey has just been completed on the Savannah end of this road from the crossing of the Ogoochee River through Guyton and for about 10 miles easterly to a point on the Central of Georgia. This survey follows the east side of the Ogoochee River, and it is thought that it will be adopted in preference to the line surveyed on the west side of the river. Another survey is being made from Stillmore easterly in the direction of Savannah, under the direction of T. P. Stanley.

Macon & Dublin.—Myrick & Bowman, of Macon, Ga., have been awarded a contract for grading the unfinished portion of this road between Macon and Dublin. They have sublet most of the work.

Manitoba & Northwestern.—Grading on the extension from Saltcoats, the present terminus of the road, northwesterly to Yorkton in Assiniboia, is so far advanced that it is proposed to begin tracklaying this week.

Marblehead & Danbury.—Articles of incorporation were filed by this company in Ohio this week. It is proposed to build a road through Ottawa County between Marblehead on Lake Erie and Danbury on the Lake Shore & Michigan Southern, a distance of about 10 miles. The Lakeside & Marblehead road is at present in operation between these points. The new road is projected by S. Sloss, of Marblehead, and others, who own lime kilns and quarries at that point. The capital stock of the new company is $75,000.

Marietta & North Georgia.—The tracklaying on the Knoxville extension was completed between Blue Ridge, Ga., and Knoxville, Tenn., on Aug. 9, the last rail being laid at a point on the Hiwassee River. Passenger and freight trains are now running the entire length of the extension, 120 miles, and to Atlanta, 227 miles. The road follows the Hiwassee River for about 25 miles, and this comprises the most difficult part of the construction work. North of Ducktown the road follows the Ocoee River for a short distance, and then reaches the Hiwassee River across the watershed between the two rivers. For many miles along the Hiawassee the mountain rises nearly perpendicular, and in many places the roadbed has been blasted out of the granite. The road at one place near the Ocoee River, is at an altitude of 1,900 ft. above the river. It descends gradually, and the maximum grade is not over 27 ft. per mile. There are no tunnels on the line, and between Hiwassee Gap and Knoxville there are no cuts exceeding 6 ft. Bridges have been built over the Hiwassee River in Polk County, over the Little Tennessee at Niles Ferry, and over the Tennessee River at Knoxville. The route through East Tennessee north of the Hiwassee River to Knoxville is through a very fertile country. The company expects a good traffic in transporting corn and other products of the East Tennessee Valley, and this season's crop has just begun to move. This will furnish a steady traffic as will also the marble quarries near the Georgia state line and in north Georgia on the old road, which has been changed to standard gauge. There are valuable coal mines in the Hiwassee Mountains and contracts have been made for carrying the coal to the furnaces at Cumberland Gap and in that vicinity. This traffic will not be fully developed until a number of short branches, up to two and three miles in length, have been built. The surveys have been made for many of these. Knoxville, Tenn., voted to issue to the company $275,000 in 20-year five per cent. bonds for the construction of the road and these will soon be paid over. The stations on the road and distances from Knoxville are: K. & A. Junction, 2; Little River, 8; Louisville, 15; Friendsville, 21; Kiser's, 23; Morganton, 31; McGhee's, 34; Little Tennessee River, 35; Kincaid

40; Madisonville, 45; Thomason's, 50; Tellico Junction, 55; Williamsburg, 61; Twin City, 65; Savannah Farms, 68; Higdon, 74; Livingston, 76; McFarland, 83; Hiwassee, 88; Condon, 90; Thompson's, 92; Turtletown, 96; Ducktown, 103; Ocoee, 107; McKay's, 109; (State Line); Barkers, 112; Cutis, 117, and Blue Ridge, 122, where connection is made with the old division.

Matamoras, Linares & Matchuala.—Ground was broken on this road at Matamoras, Mex., on Aug. 14. About 200 men are now grading the line towards Linares on the Monterey & Mexican Gulf road. From that point it is to be extended to Matchuala on the Mexican Central.

Mexican.—The Pachuca Branch of this road has been completed. It is very substantially built with heavy rails and masonry and steel cross-ties. All grade crossings have been avoided. The line will be opened for traffic in a few weeks. The non-arrival of the turntables and some of the other material is all that prevents this from being done immediately.

Middlesborough Belt.—The main line of this road, which encircles the city of Middlesborough, Ky., for a distance of 12 miles along the Yellow Creek Valley, has been completed and two miles of track have been laid on the branch being built up Bennett's Fork to coal mines, a distance of five miles. All the grading on this branch has been finished and the trestles at the upper end of Bennett's Fork are being erected.

Mississippi & Little Rock.—The tracklaying was commenced recently near Roe, Ark., by the contractor, R. W. Worthern. The road is to be built from Little Rock to Duncan, Ark., 61 miles.

Missoula & Northern.—This company has been incorporated in Montana to build a road through Missoula County, from a point on the Northern Pacific near Duncan, northeasterly to the foot of Flathead Lake, and thence around that lake to Demersville, and also to the international boundary line at Tobacco Plains. The capital stock is $2,000,000.

Missouri Pacific.—Tracklaying has been commenced at Union, Neb., on the new branch of this road, which is to extend from that point north through Plattsmouth to a connection with the present line of the Burlington & Missouri River road. It will be used as a cut-off to Omaha.

It is reported that a new survey will soon be commenced under the direction of J. B. Van Frank for an extension of the St. Louis, Iron Mountain & Southern, from a point on the line in Missouri south to lead and zinc mines in Marion County, Ark.

Missouri, Tennessee & Georgia.—Grading was commenced on this road last week, near Humboldt, Tenn. It is to extend northeasterly to Hopkinsville, Ky., and will be built by E. P. Buell & Co., of Tarlton, O. The contract for grading was let last spring to Robinson, Buckley & Co., of St. Louis.

New Orleans, Fort Jackson & Grand Isle.—The company has commenced the regular operation of passenger trains over the northern division from Algiers south to Myrtle Grove, La., a distance of about 25 miles.

New Roads.—Reference was made two weeks ago to the proposed road from Portsmouth through Greenland, Stratham and Exeter, to Epping, N. H. Two preliminary surveys have already been made and others are now in progress. The lines already run begin at the same point, on the present line of the Portsmouth & Concord near Greenland Station, and passing nearly through the centre of the town of Stratham to Exeter. One route extends east and south of the village of Exeter, entering the town on the line of the Boston & Maine. The other line crosses the Swampscott River north of Exeter, and enters the town on the Boston & Maine line from the other direction. Surveys will be made to connect with the present line of the Concord & Montreal at East Epping, and probably at other points. A survey of a line from Exeter through the towns of Brentwood, Fremont, Chester and Derry to Concord, connecting with the Manchester & Lawrence Division of the Boston & Maine, is contemplated. The surveys have been made under the direction of a committee of the Board of Trade and citizens of Exeter, and the expense has been met by subscriptions secured by the committee, of which Edwin G. Eastman, of Exeter, is chairman. The object of the road is to secure a more direct connection between Exeter with the interior of New Hampshire. It is proposed to induce the Concord & Montreal to change its present route from Portsmouth to Manchester, so as to pass through the town. If not successful in this direction, the citizens of Exeter and of the towns along the proposed route will doubtless build a road which will connect with the Boston & Maine road, and give them the required railroad connections. Arthur W. Dudley, of Exeter, is the Chief Engineer.

Some of the citizens of Grenada, Miss., are securing the right of way for a road from that point on the main line of the Illinois Central and the southern terminus of the Memphis Division, southwesterly to Parsons, Miss., the northern terminus of the Yazoo branch of the same line. The road will be about 15 mile long.

Allison Bros., of Chattanooga, Tenn., are reported to be surveying a road from Lebanon, Tenn., easterly parallel to the Nashville & Knoxville. The line begins at the Nashville, Chattanooga & St. Louis station in Lebanon, and it is understood that the survey is being made in the interest of that company.

The Aransas Harbor City & Improvement Co. proposes to build a road from a point on Aransas Harbor northwesterly, a distance of about 55 miles, to a connection with the Galveston, Harrisburg & San Antonio at Victoria, Tex. The survey is being made and some of the right of way has been obtained. Among those interested in the company are C. B. Wheeler, of Cisco, Tex., and R. Houston, of San Antonio.

A number of the directors of the Northern Pacific are said to be interested in the proposed road from Oakes southwest through Aberdeen to Pierre, S. D., on the Missouri River. The locating survey is being made by C. J. Lawrence, Chief Engineer, and the projectors claim that they will have about 75 miles of the road graded by Nov. 30. The grading will probably begin before Sept. 15. R. M. Newport, of St. Paul, is one of the directors.

New York, Susquehanna & Western.—At a meeting of the directors of the company, held this week, the issue of $3,000,000 of bonds was authorized. The bonds are secured by a mortgage given to the Central Trust Co. About $1,000,000 is to be expended in double-tracking the road from Jersey City to Paterson, N. J., work on which was begun some time ago; in filling in the long trestle work near Jersey City and extending the Lodi branch to Maywood, where it will again connect with the main line. For paying off mortgages and other indebtedness, $1,000,000 is to be used and the balance is to be reserved for improvements not yet definitely determined upon.

Norfolk & Western.—Grading is nearly completed for the second track of the Norfolk & Western from Roanoke west to Radford, Va., a distance of 32 miles, and on 12 of the 15 miles between Bluefield and Bluestone Junction, Va., on the New River division. Tracklaying has already commenced on these sections, and it is expected to have the 44 miles of track in operation in six or eight weeks. Nearly 3,000 men are reported at work.

Northern Pacific.—Donald, Smith & Howell, who have the contract for the extension of the Spokane & Palouse road from Pullman, Wash., south to Lewiston, Idaho, a distance of 72 miles, have the tracklaying completed on about 20 miles. The line will probably be finished to Lewiston about Jan. 1. Grading is being done from both terminal points and from the middle of the line.

A branch of the Spokane & Palouse road is to be built from Belmont easterly to Farmington, Wash., about five miles, by the same contractors. This will connect the Northern Pacific with the Pendleton & Spokane Falls line of the Oregon Railway & Navigation Co., in eastern Washington.

It is expected to have 10 miles of track laid on the Durham & Northern extension early next week. The construction work on the rest of the distance to the Raging River mines, 18½ miles north of Durham, Wash., will not be completed until about the middle of the year, as the country is very rough. About 600 men are at work at present and this force will soon be increased to 900 or 1,000.

About 200 men are reported at work on the line from Missoula, Mont., northwesterly to the Cœur d'Alene country, in Idaho. The track has been laid from Missoula to Quartz Creek, a distance of 35 miles. A temporary trestle has been erected across the creek, and the roadbed west of that point is ready for the track for a distance of 18 miles. Woods, Larson & Co., the contractors, expect to complete the line to Murray, Idaho, this year.

Ohatchie Valley.—About five miles of this road has been built this year between Laney and Piedmont, Ala., a total distance of 20 miles. The survey has been made for eight miles and is now in progress. It is expected that the contract for grading and tracklaying on the 15 miles to Piedmont will be awarded within three months. The road is being built by the Laney-Jackson Lumber & Railroad Co., and the principal traffic will be the transportation of mineral and timber. P. S. Fitzgerald, of Gadsden, Ala., is Chief Engineer.

Oregonian.—The contract for the construction of the extension from Coburg, Lane county, to Jasper, Or., has been let to G. V. Stevens. It is said that work will be commenced immediately.

Oregon & Washington Territory.—About 18 miles of grading has been finished on the division which is being built in western Washington from Centralia, on the Northern Pacific, westerly to Gray's Harbor, on the Pacific coast, a distance of 54 miles. About 800 men are at work with a large number of teams. It is expected to complete the road before next January. All the work is being done by G. W. Hunt, the President of the road, and no subcontracts have been let.

Pacific Short Line.—This road was opened between Covington and O'Neill, Neb., a distance of 129 miles, Aug. 16. As usual on such occasions in the western country there was a large excursion to the terminus with bands and marching and speeches. The road is a nearly direct one between the two points. Fourteen stations have been opened on the line. From the eastern end these are, with the distances in miles: Covington, 1; Jackson, 12; Waterbury, 24; Allen, 31; Dixon, 40; Belden, 51; Randolph, 60; Osmond, 73; Plainview, 83; Brunswick, 93; Savage, 101; Orchard, 107; Page, 117, and O'Neill, 129. The road has been in operation between Covington and Plainview for some time. Connections are made with three railroads: with the Chicago, St. Paul, Minneapolis & Omaha, at Covington and Jackson; with the Chicago, Milwaukee & St. Paul at Dixon and Randolph, and with the Fremont, Elkhorn & Missouri Valley at Plainview and O'Neill. A temporary bridge has been built across the Missouri River between Covington and Sioux City, and work has been commenced on the foundation for the permanent bridge, which will have two draw spans.

Peninsular.—Construction has been begun on a narrow gauge road, three miles long, from Allyn, on North Bay, to Bergen, Wash., on Hood's Canal.

Pennsylvania.—Contracts were awarded last week for the 13 miles of the Trenton cut-off road from Henderson Summit, in Upper Merion township, to Glen Loch, in Chester County, Pa., where the branch will leave the company's main line. John A. Kelly, of Philadelphia, received the contract for five miles, beginning at Glen Loch; John T. Dyer, of Norristown, for the next three miles, and Keller & Crossan, of Philadelphia, for the balance to Henderson Summit. For some time it was supposed the Pennsylvania would purchase the Philadelphia & Reading's Chester Valley branch, which connects with the Pennsylvania main line at Downington, says the Philadelphia *Ledger*, and this would have made the building of a new road from Henderson Summit unnecessary. The entire length of the Trenton Branch, from Glen Loch to Morrisville, will be 49 miles, and, as already stated, the road will not only shorten the distance for Western freight to New York, but will avoid the crowded drill yard at Fifty-second street, in Philadelphia, and thus overcome otherwise unavoidable delays in transportation. The distance between Norristown and New York will be lessened about 20 miles. The branch will be constructed with a view to running trains at as high a rate of speed as 70 miles an hour. The curvature is very slight, and the summits are so rounded off that there is no point on the road from which an engineer cannot see fully a half mile ahead. Numerous gullies, rivers and other railroads are crossed by the new line, but there will be no wooden bridges or trestling and only three iron bridges—one over the Bound Brook road, one over the North Penn and one over the Philadelphia, Newtown & New York line. The other bridges will be stone viaducts, wide enough for double tracks. That on the Neshaminy will consist of eight 50-ft. spans. The Wissahickon will be crossed on a viaduct of seven 50-ft. and three 30-ft. spans, and a similar structure of seven spans will cross the Schuylkill, between Norristown and Bridgeport. A large stone bridge will also span the Pennsylvania, Schuylkill Valley branch, about 37 ft. above grade. Connection between the two branches will be made near this bridge by means of a Y.

Nearly all the tracklaying has been finished on the extension of the Downingtown & Lancaster from New Holland westerly to a connection with the Pennsylvania, near Lancaster, Pa., a distance of about 10 miles. The extension will be placed in operation in a few days.

Perth Amboy & Woodbridge.—This company has been incorporated in New Jersey by officers of the Pennsylvania road. The objects of the company are to build a road about one mile long from the junction of the Pennsylvania with the Central of New Jersey, near Perth Amboy, N. J., to the junction of the latter road with the New York & Long Branch at the Raritan River drawbridge, thus giving the Pennsylvania an independent line to its connection with the Long Branch line. The Pennsylvania now uses the Central of New Jersey tracks for about one mile. It is proposed to build the road at once.

Phillips & Rangeley.—About 10 miles of grading has been completed from Phillips northwest toward Rangeley, Me. Tracklaying will begin this week on the first six miles of the road. It is expected to have the entire 28 miles completed this fall.

Pittsburgh, Ohio Valley & Cincinnati.—This company has increased its capital stock from $1,000,000 to $1,500,000, and a new charter has been filed in Ohio changing the title of the road from the Ohio Valley Railway Co. to the above, as stated last week.

Port Arthur, Duluth & Western.—It is stated that the company has completed the arrangements for building the road to the Minnesota state line near Gun Flint Lake. The track has been laid on 20 miles of the road and 30 miles have been graded. Rails have been ordered from England and trains will probably be running to Gun Flint Lake, where there are iron mines, early next spring.

Qu'Appelle, Long Lake & Saskatchewan.—The tracklaying has been completed from Saskatoon northwest about 80 miles to a point 10 miles south of Prince Albert, in Saskatchewan, the northern terminus of the road. Grading has been finished to the latter point, which is about 260 miles from Regina. The contractors are removing their outfits to the Calgary & Edmonton road. The line is in operation between Regina and Saskatoon, about 170 miles.

Rumford Falls & Buckfield.—The present owners of this road have sold the property to Brown & Chisholm, of Portland, Me, and others who own the extensive water power at Rumford Falls, Me., about 15 miles west of the present northern terminus of the road. An extension is to be built to that point.

St. Louis, Arkansas & Texas.—The United States Circuit Court, at Tyler, Tex., has ordered the sale of this road to take place on Oct. 23, under the direction of the Master in Chancery previously appointed. The road is to be sold for not less than $2,000,000.

St. Paul, New Ulm & Southwestern.—C. B. Tyler, of Marshall, Minn., is now engaged in securing right of way from St. Paul to New Ulm, Minn., and the officers claim that the road will be built next season. It was incorporated several years ago, but little has been done except to make a few surveys.

Salt Lake & Bountiful.—Varley & Everill, of Salt Lake City, are the principal contractors on this road, which is being built from Salt Lake City to Bountiful, Utah, a point about eight miles north of the former city. The locating surveys have been completed and grading is now in progress. The maximum grades are 1.3 per cent. The maximum curves are eight degrees. S. Bamberger, 126 Main street, Salt Lake City, is General Manager, and H. S. Joseph, also of that city, is Chief Engineer.

San Antonio & Aransas Pass.—The receivers have been authorized to expend $150,000 in ballasting the main line of the road.

San Bernardino & Eastern.—This company has been incorporated by officers of the Southern California to build a belt line at San Bernardino, Cal., from that town through Highlands to a connection with the present line of the Southern California about 15 miles distant.

Seattle, Lake Shore & Eastern.—The tracklaying on the Northern branch referred to last week has been completed on 45 miles, 42 miles from Snohomish Junction, Wash., north, and from the Skagit River near the sixtieth mile post, north for three miles. Twenty miles of this work has been finished since Jan. 1. Thirty miles additional has been graded ready for tracklaying and the balance of the work is well under way. About 500 men are at work on the branch. The clearing is very heavy, but the grading is comparatively light work. The grades are 80 ft. per mile and the maximum curves are six degrees. The most important bridges are at the Snohomish River, 400 ft long; Steillaguamish River, a 240 ft. draw span; Pilchuck Creek, 100 ft. deck Howe truss; Skagit River, 650 ft. combination and draw span; south fork of the Nooksack River, 250 ft. combination and a short shore span; and at the north fork of the Nooksack River 420 ft. Howe truss. There is a 4,000-ft. pile trestle at the Steillaguamish River and a 7,000-ft. pile trestle at the Skagit river.

The names of most of the contractors have been published heretofore, but the following list gives the names of all the principal contractors and the sections awarded to each from Snohomish Junction through Snohomish and Sedro to the international boundary: Earle & McLeod, sections 20 to 50; J. K. Murphy, 50 to 61; P. H. Smith & Bro., 63 to 78, all of Seattle; Clements, Bradford & Co., 78 to 88; M. J. Henry, 88 to 98, both of Nooksack, Wash. The San Francisco Bridge Company, of Seattle, has the contract for the bridges and trestles, except between the 20th and 61st miles.

Sebasticook & Moosehead.—The citizens of Athens, Me., are engaged in raising a subsidy for an extension from Hartland to Athens, about 11 miles, and the amount which it is stated will insure the building of the extension by the company, $26,000, has been raised, with the exception of about $4,000.

Sinnemahoning Valley.—The cut-off of this road, about two miles long, which was begun a few months ago, has been completed and is now in use. Grattan & Jennings, of Buffalo, N. Y., were the contractors.

Southern Pacific.—Tracklaying is said to have been recently commenced on the graded extension from Newman south to Firebaughs, Cal., on the San Joaquin River, about 15 miles. This line has been graded along the east side of the San Joaquin Valley as far as Tulare, Cal., 40 miles south of Newman.

South Lyons & Northern.—This company has been recently organized to operate the South Lyons branch of the Toledo, Ann Arbor & Northern, from Lelands to Lyons, Mich., seven miles. The title to the branch has been transferred to the new company, the consideration being $140 000.

Tacoma & Eastern.—The company has commenced condemnation proceedings for right of way through certain sections of Tacoma, Wash., by an action begun by its Vice-President, E. Hart. The road is to extend from the water front at the city of Tacoma to a point not definitely located about 30 miles from Tacoma in a southwesterly direction. It is understood that the company intends to reach the timber country in the vicinity of the Mashel and Nisqually rivers, southwest of Mount Tacoma.

Temiscouata.—The grading on the St. Francis branch has been completed for about seven miles on the first section from the connection with the main line near Edmundston, N. B. The work on this part of the line is quite heavy, but on the rest of the extension it is rather light. The line has been located for 20 miles and work is in progress for that distance. The extension will be about 36 miles long and will extend from Edmundston southeasterly along the St. John River to the mouth of the St. Francis River, passing through St. Hillaire, Caron Brook and Upper St. Francis. About 300 men and 80 teams are at work. Tracklaying is to be commenced in a few days. It is expected that the maximum grades will not exceed 1.3 per cent. or the maximum curves five degrees. Two steel bridges, one 150 ft. long and the other 50 ft. long have been built. There will be one other steel bridge on the line 60 ft. long. The largest trestle is 300 ft. long and 80 ft. high in the centre.

Tobique Valley.—The company has received a local subsidy for the extension of its road west of Perth, N. B., toward Tobique Lake, and it is stated that the contract has been awarded for building 14 miles of the extension.

Toledo & Michigan Belt.—The tracklaying and ballasting on this road which is being built by the Michigan Central from a point on its Toledo Division in Toledo to a connection with the Wheeling & Lake Erie in North Toledo, O., a distance of 3½ miles, will probably be finished this week.

Tombigbee.—The officers of this company are securing right of way between Moulton and Decatur, Ala., and subsidies have been asked of several of the towns. They claim that grading will begin about Jan. 1 on the line between Columbus, Miss., and Decatur. C. E. Rodenberg is General Manager and A. C. Dancy is Chief Engineer.

Unaka & Nolachucky.—A company is reported as being organized in Kentucky under this unique and cacophonous name to build a road from Morristown to Embreeville, Tenn.

Union Pacific.—It is expected that tracklaying will be commenced this week on the Milford extension, which has been graded as far as Pioche, Nev., a distance of 115 miles. The contractors are Kilpatrick Bros. & Collins, of Beatrice, Neb., and they are employing about 1,000 men and 200 teams. There are six tunnels on the line aggregating 2,320 ft. in length. The longest tunnel is 651 ft. long, and the shortest, 227 ft. The work is very heavy on about 40 miles of the line. There is no truss bridging on the entire extension. The maximum grade is 106 ft. per mile and the curves 10 degrees.

Tracklaying is to begin in about three weeks on the extension of the Cheyenne & Northern from Wendover northwesterly to a connection with the Fremont, Elkhorn & Missouri Valley road, near Fisher Station, Wyo., and about 15 miles east of Douglas. The extension is about 29 miles long. All the grading has been completed, as already reported. There is one Howe truss bridge, containing two spans of 120 ft. each. There are no iron bridges.

The grading is to begin in a few days on the relocation of the Union Pacific, Denver & Gulf through the mountains between Elizabeth and Parker Station, Col., about 12 miles. The present grade between these points is a little over two per cent., and it is expected that on the grade of the new line, which will be built around the hill on which the present track is located, the engines will be able to haul 18-car trains over the division.

Weatherford, Mineral Wells & Northwestern.—The stockholders, at a recent meeting in Weatherford, Tex., authorized the execution of a deed of trust to the Central Trust Co., of New York, to secure an issue of bonds amounting to $500,000. The previous mortgage for $350,000, given to the Equitable Mortgage Co., of New York, has been cancelled. The grading between Weatherford and Mineral Wells, Tex., is about half completed. The road is to be 21 miles long and will reach coal mines at Mineral Wells. Tracklaying will begin about the middle of September.

West Virginia & Pittsburgh.—The standard gauging of the division from Weston easterly to Buckhannon, W. Va., a distance of 15 miles, is expected to be finished next week. Grading is progressing on the extension east of Buckhannon and it will probably be completed to the Three Forks of the Buckhannon River in a few days. Track is being laid from Weston south to Sutton, near Braxton, about 44 miles, and both this line and that to Three Forks will be ready for operation some time this winter.

White River.—The articles of incorporation were filed in Washington recently. The capital stock is $200,000. The object of the incorporation is to build railroad and navigation systems from Buckley. A road is to be built from Buckley southwesterly along the White and Greenwater rivers to points on the Columbia River, and in a westerly direction from Buckley by way of the White and Puyallup valleys to points on Puget Sound.

White River Valley.—The charter of this company was filed in Washington. It proposes to build a road for freight and passenger traffic from Buddy, down the White River Valley to Sumner, through Connell's prairie and Lake Tapps, and to Tacoma, a total distance of 38 miles.

GENERAL RAILROAD NEWS.

Danville & New River.—This narrow-gauge road, extending from Danville to Patrick Court House, Va., 75 miles, was sold Aug. 27 at public auction in Danville under an order of the court to satisfy the claims of bond holders. J. Willcox Brown, of Baltimore purchased the road, it is said for the Richmond & Danville.

Fitchburg.—An arrangement has been reached which is expected to end the litigation between the Troy & Boston and the Fitchburg roads, regarding the withholding of dividends under certain circumstances from the owners of Troy & Boston preferred stock, and incidentally, concerning the payment of interest on $1,300,000 of Troy & Boston bonds, which figured in the consolidation of the two roads. These bonds are due in 1924, and the Troy & Boston stockholders held that interest should be paid as it accrued semi-annually, while the Fitchburg contended that it was not called upon to pay interest until the date of maturity of the bonds. This gave rise to much complicated litigation. The bondholders sued the Troy & Boston road for their interest, the latter sued the Fitchburg for dividends withheld on preferred stock, and there were some other phases of the affair. Now an arrangement has been concluded by which the Troy & Boston issue of Fitchburg preferred stock, with such collateral rights as attached to the old Troy & Boston stock, which was exchanged for this preferred stock, can now be exchanged for clear Fitchburg preferred stock in the ratio of 10 shares of the Troy & Boston for three shares of the clear preferred.

Illinois Central.—The net earnings from traffic for the months ending July 31, 1890 and 1889 (July, 1890, estimated), were as follows:

	1890.	1889.		
Average miles operated....	2,275	2,275		
Gross earnings.....	$1,095,229	$1,092,494	I.	$2,735
Oper. expenses and taxes...	806,367	681,784	I.	124,583
Net earnings.....	$288,862	$410,710	D.	$121,848

A dividend of three per cent. in cash from the net earnings of the six months ending June 30, 1890, has been declared.

The Dubuque & Sioux City Co. reports its gross and net earnings for the months ending July 31. 1890, and 1889 as follows. (July, 1890, estimated.)

	D. & S. C.		Cedar Falls & Minn.		Both roads.		
	1890.	1889.	1890.	1889.	1890.	1889.	Inc.
Miles.....	524	524	76	76	600	600	.....
Gross earn.	$150,258	$130,625	$8,678	$6.984	$158,936	$137,609	$21,327
Oper. exp..	125,623	107,185	10,808	11,487	136,431	118,672	17,759
Net earn..	$24,635	$23,440	$2,130	$4.503 —def.—	$22,505	$18,937	$3,568

New York, Chicago & St. Louis.—The company is said to propose the building of a branch, or cut-off, from its present line at South Whitley, northwesterly 8 miles to Warsaw, and thence to Argos, Marshall County, Ind., where connection will again be made with the main line. If the road is built, it will probably be used as part of the main line, and the present line between South Whitley and Argos for local business.

New York & New England.—The following statement shows the comparative earnings of the road in July for the last two years:

	1890.	1889	Increase.
Passenger	$191,367	$180,295	$11,072
Freight.....	406,886	283,317	23,569
Mail.....	4.920	4,460	460
Express.....	10.709	10,960	251
Miscellaneous.....	15,020	13,035	1,985
Total..	$518,004	$492,069	$36,835

Pennsylvania.—The following is a statement of the business of all lines of the company; the lines east of Pittsburgh and Erie for July, 1890, as compared with the same month in 1889, show an increase in gross earnings of $132,792, an increase in expenses of $632,983, a decrease in net earnings of $500,191. The seven months of 1890, as compared with the same period of 1889, show an increase in gross earnings of $4,087,067, an increase in expenses of $4,021,479, an increase in net earnings of $65,588. All lines west of Pittsburgh and Erie for July 1890, as compared with the same month in 1889, show an increase in gross earnings of $427,227, an increase in expenses of $332,414, an increase in net earnings of $94,813. The seven months of 1890, as compared with the same period of 1889, show an increase in gross earnings of $3,328,158, an increase in expenses of $2,225,567, an increase in net earnings of $1,102,591.

Philadelphia & Reading.—The statement of the company for July, 1890, as compared with the same month of 1889, shows gross receipts from traffic of $1,840,983, an increase of $36,672; gross expenses, $967,360; increase, $64,376; profit in operating, $873,622; decrease, $27,704; net receipts from other sources, $119,437; increase, $6,824; profit from Dec. 1, 1889, to July 31, 1890. $5,794,714, an increase of $626,855. The statement of the Philadelphia & Reading Coal & Iron Co., for the same period shows: Gross receipts, $1,795,840; gross expenses, $1,887,906, being a loss of $92,066. In July, 1889, there was a profit of $32,740. For the seven months ended July 31, 1890, the loss was $703,080 against a loss of $1,052,685 for for the corresponding period of 1889.

Pittsburgh, Cincinnati, Chicago & St. Louis.—The company filed in Illinois last week articles consolidating the Pittsburgh, Cincinnati & St. Louis; the Chicago, St. Louis & Pittsburgh; the Cincinnati & Richmond, and the Jefferson, Madison & Indianapolis, all these companies having voted in favor of the consolidation at special meetings held last week.

Stillwater Union Depot & Transfer Co.—The Wisconsin Central has leased the right to use this company's tracks at Stillwater, Minn., and on Sept. 1 regular short line trains will be put on between that city and St. Paul. On the same date the Chicago, Milwaukee & St. Paul will run its trains into the Stillwater Union Depot. New side tracks have been surveyed and will be put in at once.

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, July 27, 1890.

The representatives of the western lines, after lengthy conferences, were unable to agree unanimously as to what course they would pursue in regard to the order of the commission in regard to rates on food products. A majority of the roads have finally decided to petition the Commission to reopen the case, and the petition has been sent to the Commission. The roads signing the petition will waive none of their existing objections to the order, but ask a hearing mainly on the grounds that the changed conditions of the grain situation have removed any necessity which might have existed for a reduction of the rates; that the proposed differential in favor of St. Louis as against Chicago is not warranted; and that the enforcement of the proposed rates will extend the reduction to territory where it has not been asked and which was not under consideration when the commission made the investigation. Pending a reply by the commission, none of the lines will put in effect the rates ordered.

The Texas Traffic Association, after a long discussion, has finally agreed to a restoration of rates Sept. 1. They were unable to agree as to the basis from New Orleans, Galveston, St. Louis and other initial points, and this matter is to be arbitrated. In view of this action the Central Traffic Association has resumed the making of through rates and divisions with the Texas lines.

Chairman Goddard of the Western Passenger Association has fined the Alton $100 for cutting the rate between Chicago and Joliet without authority from the association.

At the meeting of the Chicago Committee of the Central Traffic Association yesterday the Wabash declined to use the uniform bill of lading in its present form, except on the company's fast freight lines; and the Big Four and Grand Trunk declared that they would not put the bill in force on September 1, as agreed, unless action was unanimous.

Probably the date will be postponed.

Traffic Notes.

The shippers of Atlanta, Ga., have organized a freight bureau to be called "The Associated Manufacturers of Atlanta."

The Baltimore Car Service Association has compromised with the complaining flour dealers, and will allow six days' free storage on flour.

Forty-two English railroad companies now print on local tickets the price at which the ticket is sold, in accordance with a regulation of the Board of Trade.

The Trunk Line Passenger Committee has voted to sell party rate tickets to parties of 10 children at 1 cent per mile. The rule has already been put in force on the Pennsylvania.

A western paper states that the Interstate Commerce Commission has sent a letter to the various state railroad commissions on the ticket scalping question, asking for co-operation.

At a meeting of the Philadelphia & Reading, the Lehigh Valley and the Central of New Jersey, Aug. 21, it was agreed to reduce the rates on coal and pig iron to tide-water points, and also to reduce the rates on ore from tide water and certain points in New Jersey, the reduction to take effect on Aug. 27.

The Minneapolis, St. Paul & Sault Ste. Marie recently made a request of the customs authorities that dutiable merchandise, transported in bond from New York through Canadian territory to Minneapolis be allowed to re-enter the United States at Gladstone, Mich., for transshipment. The request was refused for the reason that Gladstone is neither a port of entry nor a sub-port in charge of a Deputy Collector of Customs.

The Georgia railroad commission in the case of the Southern Agricultural Works against the Richmond & Danville, has decided that freight transferred from the Richmond & Danville to the Georgia Pacific, or vice versa, by the belt road, must not be charged for at switching rates ($1 per car), as the Richmond & Danville and Georgia Pacific "are one and the same road." The rate, it is declared, should be computed on continuous mileage to the point of destination.

Although the statements of all eastbound shipments from Chicago have shown no marked change in the last two weeks the course of shipments of flour, grain and provisions shows quite plainly that the Grand Trunk has increased its proportion at the expense of the Lake Shore and other roads, so that it is evident that the boycott on account of the obnoxious bill of lading was not all talk. The strike on the New York Central and the threatened strike on the other Vanderbilt lines have caused a decided increase in some classes of shipments on the other trunk lines.

Iowa Joint Rates.

At Iowa City, on Aug. 22, Judge Fairall filed an opinion in the case against the Iowa railroad commissioners to restrain them from proceeding to enforce their schedule of joint rates, the Burlington, Cedar Rapids & Northern being the complainant. The opinion holds that the act under which the schedule was made does not create such joint or partnership relations as create joint liabilities; that the power of the state to regulate private property affected with a public interest is limited by constitutional guarantees; that whether the law can compel the use of cars for through transportation is not decided; that there is no authority to compel the transfer of freight at connecting points in car lots without charge and less than such lots without cost; that the act in effect makes terminal companies of the others engaged in the haul, for which there is no authority, or requires the shipper to pay at each transfer, which is impracticable. Other points are touched upon, the whole being a decision that the order of the commissioners was unlawful.

East-bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, Aug. 23, amounted to 64,317 tons, against 56,438 tons during the preceding week, a increase of 7,879 tons, and against 46,372 tons during the corresponding week of 1889, an increase of 17,945 tons. The proportions carried by each road were:

	W'k to Aug. 24.		W'k to Aug. 17.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central.....	6,733	10.5	6,466	11.4
Wabash.....	3,994	6.2	4,337	7.7
Lake Shore & Michigan South.	9,592	14.9	8,682	15.4
Pitts., Ft. Wayne & Chicago...	8,615	13.4	5,782	10.2
Chicago, St. Louis & Pitts.....	7,471	11.6	7,088	12.6
Baltimore & Ohio	4,040	6.3	3,444	6.1
Chicago & Grand Trunk.....	9.537	14.8	7,820	13.9
New York, Chic. & St. Louis...	7.724	12.0	6,780	12.0
Chicago & Atlantic.....	6,611	10.3	6,030	10.7
Total.....	64,317	100.0	56,438	100 0

Of the above shipments 2,520 tons were flour, 25,285 tons grain, 1,732 tons millstuffs, 7,130 tons cured meats, 2,778 tons lard, 8,992 tons dressed beef, 1,576 tons butter, 2,140 tons hides, 503 tons wool, and 7,050 tons lumber, The three Vanderbilt lines carried 37.4 per cent., while the two Pennsylvania lines carried but 25.0 per cent.